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QUEENSLAND AGRICULTURAL JOURNAL

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Agriculture.

THE INFLUENCE OF AGRICULTURAL CONFERENCES ON FARM LIFE.

By THE EDITOR.

One of the great advantages which the farmer has over all other workers is the healthfulness of his occupation. His work may be, and undoubtedly is, hard; but if he would pause to think of his surroundings, of his conditions of life, and of the wide and promising field which it opens to him for scientific research—if he would recognise that his is a vast and elevated arena in which he may exercise his mental as well as his bodily powers—if he would see that his art or profession is one in which distinction and honour are to be attained, even more worthily than by the more mentally laborious, learned, and other professions—then would he realise that his life and profession are things in which he may justly rejoice.

He stands before the world as a public benefactor, in the generality of cases, however, without being conscious of the fact. Farming is the only business in the world in which the man who can beat his neighbours in his results, produce better crops, and surround himself with greater comforts, becomes a public benefactor. This is clearly enough to be proved. The tradesman who gets up in the world, does so at the expense of his customers and of his brother traders. He makes money, if successful, by what are called smart business strokes, but successful dealing does not constitute him a public benefactor, rather the reverse, and his methods are of no importance or value to anyone but himself. No one is the richer for his exertions but himself, but many are poorer.

The farmer, on the other hand, cannot, even if he wished to do so, hide the secrets of his success. All his work is open to the world to criticise and emulate or to improve on. Has he succeeded in producing the two proverbial blades of grass, he does not keep his methods to himself, but he calls his friends and neighbours together to rejoice with him over his success, and to show them how they may go and do likewise. The way in which he sets about the tilling of his land, the treatment of his stock, the seasons at which he sows, plants, and reaps, the manner in which he stores and markets his produce, are all open secrets, which he gladly imparts to his neighbours. Not content with his immediate friends, he does what he can to spread his superior knowledge throughout the country, and in no better manner does he do this than by attending agricultural meetings and conferences, where he either speaks or reads papers on subjects with which he is better acquainted than others.

We are led to these remarks by considering the work done at the several Conferences held in the past, where some 150 of the most intelligent and highly trained planters, farmers, orchardists, and dairymen have given Australia the benefit of their ripe experience and of the experience of those who sent them to the Conference to represent them. These hundred and odd delegates were exponents of the views of probably a hundred thousand people engaged in rural occupations. Their papers and speeches, and the animated discussions thereon, will be read by many hundreds of thousands of agriculturists, fruit-growers, planters, and others, not only throughout Australasia, but almost over the civilised world; for the *Queensland Agricultural Journal*, in which the proceedings of the Conferences were published, finds its way from Queensland to the outside four-fifths of the world. We merely mention this to show that the farmers, so far from hiding their light under a bushel, as tradespeople do with the secrets of trade, blazon forth their successes equally with their failures, and thus, as we have said, become public benefactors. Their success in life has this to still further sweeten it: It has not been the result of grinding the life out of others, it has caused no single heartache to unfortunate debtors, but has been hardly earned and honestly gained, and everyone round these captains in the ranks of practical farmers is, or ought to be, the richer for the example they furnish, while no one is made poorer by their success.

The Annual Conferences, which were held alternately at the various centres of the agricultural industry, exercised a most beneficent influence upon the various branches of agricultural science. During the course of the year, new discoveries, new inventions, new plants, and new methods come thick and fast; and what time so well chosen to propagate all new ideas as the week of the Agricultural Conference, where men are gathered together from the four corners of Queensland, intent upon giving and receiving those new ideas?

Our forefathers, even in this fertile land, have reaped the fruits of the virgin soil with scanty appliances and little experience in farming. The rich soil bountifully responded to the most barbarous methods of cultivation. But they have left us, as an inheritance, the duty of restoring the land to its original fertility. How are we to do it? It must

be accomplished by thorough cultivation, subsoiling, drainage, irrigation, and the liberal use of farmyard manure and artificial fertilisers. The modern farmer must, and usually does, discard all antiquated machinery and implements—he casts to the winds many time-honoured fallacious theories. He makes horse, wind, water, and steam do the work our forbears did with their hands. This gives him time to improve his mind by studying modern agricultural literature. It is no longer necessary for him to work sixteen hours a day to "get there." If we reflect on the extent to which we old farmers in the sixties taxed our young muscles at the expense of our brains, the wonder is that we are as intelligent as we are. But for this we have to thank agricultural shows and conferences. There we have tardily learned the lessons by which our sons are now profiting. It cannot be gainsaid that the dull, plodding, hard-labour farmer, who has no time to read, who begins his laborious day tired, and ends it worn out with fatigue, cannot nowadays become a successful farmer. He must blend exercise of the muscles with exercise of the mind. There are no problems in the exact sciences, no questions of law, no intricacies of engineering, so difficult as the problems presented by nature to the farmer. He has to grapple with exhausted soils, insect pests, the vicissitudes of the seasons, with storms, floods, and droughts, with diseases of various animals, with low prices, and short crops. In fact, the whole powers of Nature are alternately arrayed against him, and he must overcome these or go under. Here, then, he has scope for exercising all the faculties of his mind and body, and he has to call to his aid the botanist, the entomologist, the geologist, the chemist, and a host of others expert in some one particular branch of science on which the operations of the farmer depend. By their aid and the exercise of his mental powers, he is enabled successfully to combat and check injurious agencies, to retain and increase the fertility of his land, and to employ such machinery in his work as will leave him ample leisure to read and study the principles of what may be called the noblest and most useful of all professions—agriculture.

SCIENCE *VERSUS* ROUTINE.

"The genius of scientific progress, after creating miracles in the industrial domain, has at last seriously undertaken to demolish agricultural routine, that fortress behind which agriculturists have entrenched themselves, and where the deaf and blind will not hear nor see what is to their advantage, thus slowly, very slowly, has agriculture progressed in this age of gigantic strides and discoveries." So wrote Eugene Lange some years ago in the "Official Journal of the Central Board of Agriculture of Trinidad."

The last revelation will cause a revolution in agriculture. The worn-out soil of old Europe will become as productive, if not more so, than that of the Far West of America. The earth will lose its prestige—for there will be no difference between good and bad soil—since soil is not necessary to grow potatoes.

The eminent agronomist, Alfred Dudony, has succeeded in growing potatoes, most esculent, in wire baskets without a particle of earth. It is thus proved that eclosion, life, and prosperity of plants in general, and potatoes in particular, will not require them to bury their roots in the earth, since, with chemicals and scientific culture, they will be independent of soil.

Mr. George Ville having sown four grains of wheat on burnt sand, and watered them with some chemical solution, obtained, for every grain of seed, 20 grains of wheat with straw. The result of these experiments goes to show that the soil itself has no creative power or virtue. Its functions are to support vegetation, to store and distil, under the influence of light, heat, and electricity, the alimentary substances indispensable to the auto-creation, self-conservation, and automatic development of the organs and tissues of plants. The alimentary substances are known, have been counted and analysed. There are fourteen, not one more, not one less, asserts Mr. Emile Gautier. Organic substances: Carbon, hydrogen, oxygen, and azote. Mineral substances: Phosphorus, sulphur, chlorine, silicium, iron, manganese, calcium, magnesium, sodium, and potassium. These fourteen substances nourish all plants without distinction—the tiny grass as well as the giants of the forest—alimentary, venomous, tinctorial, gummy, oleaginous, resinous, textiles, flowers, fruits, &c. The differences are the result of variety of combinations of the primary substances that may be compared to the combination of the twenty-six letters of the alphabet, forming a variety of words.

Of these fourteen substances essential to the life of plants, 93 per cent. are supplied by the atmosphere. In presence of such facts, evidently mere routine will not give an equal result conducive to increased crops from a given acreage.

It is absolutely necessary that the agriculturist should know what relation there is between the plant he cultivates and the soil on which it is cultivated. Advanced scientific agriculture is possible only with the aid of scientists. But it is quite easy for the intelligent agriculturist to step aside from routine and cultivate properly and judiciously. The following approximative analysis, which can be made without apparatus or more than one chemical, will answer in most cases, and ensure better results than are now obtained by many agriculturists.

TO MAKE AN APPROXIMATE ANALYSIS OF SOIL.

1. Take a given quantity, free from stones or other foreign substances.

2. Dry it perfectly.

3. Take 1 lb. of the soil so prepared, burn it to a red heat; weigh. The difference from the original weight will register the amount of humus.

4. Cool down; then pour on it three times its volume of rain water. Stir with care and subside. Next evaporate the water. Its residue will show the soluble salts.

5. What is now left to experiment upon is pure mineral earth. Pour on it some water, stir well and treat with nitric or muriatic acid

until no effervescence is notable. Then drain, dry, and weigh. The difference from the last obtained weight will register the calcareous part.

6. Dry what earth is left, wash it freely, allowing the water to escape slowly. Continue doing so as long as the water is coloured. Then dry and weigh, and you will have the arenaceous (sandy) portion. The result of these operations will give the proportional composition of the soil experimented on.

COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

From Mr. J. C. Brünnich's work on the application of artificial fertilisers in order to increase the productiveness of the soil, we select the following formulæ for mixed fertilisers suitable for various crops:—

FARM AND GARDEN.

ASPARAGUS.

This plant requires a friable, well-trenched loam, rich in humus.

Heavy dressings of well-rotted stable manure, half-decayed leaves and straw, bones, &c., should be well incorporated with the soil.

The value of the stable manure is greatly increased by the addition of—

$$\left.\begin{array}{l} 2\frac{1}{2} \text{ cwt. bonemeal} \\ 2\frac{1}{2} \text{ cwt. superphosphate} \\ 1 \text{ cwt. sulphate of potash} \\ 2 \text{ cwt. nitrolim} \end{array}\right\} \text{per acre.}$$

or the same quantities in pounds—viz.—

2½ lb. each of bonemeal and superphosphate
1 lb. sulphate of potash; and
2 cwt. nitrolim

for every 43 square yards of ground.

A good sprinkling with common salt when preparing the bed gives often good results.

When the shoots begin to appear, a dressing with 1 cwt. of nitrate of lime per acre, or 1 lb. per 43 square yards, can be applied to great advantage.

Asparagus is one of the few plants which likes chlorine (a constituent of common salt and of muriatic acid); and, therefore, in the above formula 1 cwt. of muriate of potash may be used instead of the sulphate.

BEANS.

Beans grow well on almost any soil, but prefer a well-drained clayey loam. Like all leguminous crops, beans require lime, and the soil should contain a fair amount of this plant food. Apply per acre, according to the quality of soil—

2 to 3 cwt. of superphosphate;
¾ to 1½ cwt. of sulphate of potash;
None to ½ cwt. of nitrolim (or dried blood).

When the beans are grown to be eaten green, the amount of nitrogenous manure can be considerably increased by using 1 cwt. of nitrate of lime, applied in three or four portions as topdressing.

For use in garden, apply—

6 lb. superphosphate,
2 lb. sulphate of potash,
½ lb. nitrolim,

and three topdressings of ½ lb. of nitrate of lime to every 43 square yards.

BEETS AND BEETROOTS.

Beets prefer a fairly rich sandy loam, but will do well on almost any soil, as long as it is not stiff and clayey. Well-rotted farmyard manure should be applied some time before sowing, and the following artificial fertiliser mixture used when thinning out or transplanting:—

2 to 3 cwt. superphosphate
¾ to 1 cwt. sulphate of potash
1½ to 2 cwt. nitrolim or sulphate of ammonia } per acre,

followed by a topdressing with 1 to 2 cwt. nitrate of lime about a month later. The sulphate of potash may be with advantage replaced by muriate of potash, or, when the sulphate is used, a dressing of common salt will be found beneficial.

Should the beet be grown without a previous application of farmyard manure, the quantity of artificial fertiliser must be increased, using—

4 to 6 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
2 to 3 cwt. of nitrolim } per acre,

when planting, followed by a topdressing of 1 to 2 cwt. nitrate of lime.

In a garden use—

6 lb. of superphosphate,
2 lb. of sulphate of potash,
3 lb. of nitrolim or sulphate of ammonia

for every 43 square yards of ground, followed by a topdressing with 1 to 2 lb. of nitrate of lime.

CABBAGES.

Cabbages may be grown in almost any part of Queensland under certain conditions, but naturally do best in the colder district. Rich, mellow soil, containing plenty of humus, and an abundant supply of water are required. From 10 to 15 tons of well-rotted farmyard manure per acre, or from 2 to 3 cwt. to every 43 square yards, should be applied when the ground is being prepared. At the time of planting apply—

½ to 1½ cwt. of sulphate of potash
4 to 6 cwt. of superphosphate
2 to 3 cwt. of nitrolim or sulphate of ammonia } per acre,

and about a month later a topdressing of 3 cwt. of nitrate of lime. A second topdressing with 1 cwt. of nitrate of lime, when cabbages begin to heart, is very beneficial.

The same amounts of fertilisers in pounds should be applied in a garden to every 43 square yards, or, as large cabbages should be planted about 3 feet between rows, to every row 43 yards long.

Should no or only a small amount of farmyard manure be available, the amount of nitrogenous manure should be increased by at least one-half.

Commercial mixed fertilisers, containing, besides water-soluble phosphoric acid, 3 to 4 per cent. of nitrogen, and about 2 per cent. of potash, may be used in quantities from 3 to 4 cwt. per acre at the time of planting, a second dressing of 2 to 3 cwt. about a month later, and a third dressing of 1 to 2 cwt. when hearts begin to form.

(To be continued.)

PROSPECTIVE POTASH RELIEF.

The "London Public Ledger" recently published the following notes on the question of potash supplies from the "New York Oil, Paint, and Drug Reporter." As the matter is one of great importance to our readers on all sides, we have pleasure in reprinting same, in the hope that it may enable them to obtain any supplies of complete manures that they may need for the coming season more easily than seemed likely without the modifications mentioned by our New York contemporary. If the United Kingdom has permitted the export of cacao to help her colonies and allies, no doubt a way will be found to do the same with potash. According to the "New York Reporter"—

"The week's developments in the potash situation, reflecting the influence of the German embargo upon exports from the country, have been in some respects of a more reassuring character, and, while further advances have been made in some of the salts in the local market, a more reasonable spirit seems to have dominated late trading. In several important instances of embargoes by the foreign Governments affecting the "Reporter's" interests, substantial modifications and concessions have been made, and members of the local trade most directly concerned in the potash restriction have not hesitated to express their confidence that some means will be found within reasonable time, operating to relieve the harsh and unqualifying force of the German decree. Within the last few days has been received from our Berlin consul a cablegram signifying that the German Government has been brought fully to the realisation of the serious loss in revenue and incidentally the hardship that would inevitably follow the absolute restriction upon potash exports. This message voiced the willingness of the German authorities to modify the embargo in its most vital effect—namely, to permit the shipment of potash from the country only after it had been subject to such a denaturing process as would limit the product's consumption strictly to the field of fertilisers. This limitation bears out the force of the argument generally advanced here to justify Germany's action, that it was prompted chiefly to check its possible use in the manufacture of munitions of war by belligerent countries.

"The proposal to denature potash so that it would be incapable of entering any service outside the fertiliser field has attracted widespread interest and comment throughout the local trade, where the subject has been recognised as one of novel and more or less perplexing possibilities. There has apparently never been an occasion before to resort to any means to divert potash from its natural properties, and by what chemical agents this change in its character can be effected, what transformation may be involved in the methods of manufacture in which potash enters as a basic material, or by what processes the fundamental properties can be recovered, are among the problems to confront our importing and consuming interests if this denaturation scheme is carried out. It has been suggested that a sulphating basis might be tried to restrict potash to its most peaceful service, as this method would be simplest and easiest to fulfil the purpose intended. German chemical science has worked out many more intricate questions, and if there may be any sincerity in the desire of the German authorities to satisfy the agricultural needs of the neutral countries, we may feel a reasonable degree of confidence in our share of potash shipments for service in the coming season. Manufacturers of chemical compounds in which potash cannot be replaced may find the question of prospective supplies less hopeful of solution. When the new conditions which they may have to meet are known it will be a keen test of wits in which our ingenuity and adaptability must play their best rôles. The question has been raised in local quarters as to whether there had been any real foundation for the presumption that our imports of potash were being employed in any service detrimental to German interests, since our needs of the material for the usual peaceful arts and manufactures have been so urgent during the last few months as to make any ulterior use an economic perversion.

"The subject of a more capable development of our potash resources has naturally commanded more serious study since the announcement of the German export embargo. The latest advices leave us in apparently the same state of hopelessness as ever. Prospects for bringing the production at Lake Searles, in Southern California, to a commercial realisation now seem to have had little more than a fantastic foundation."
—"Tropical Life."

SEED SUPPLY FOR 1916.

BY F. F. COLEMAN, Department of Agriculture and Stock.

Owing to the certain scarcity caused by the war, it is of the utmost importance that seed merchants in Queensland make early arrangements for their next season's supply of vegetable and flower seeds; and those who are in the position to import their own supplies would do well to at once get into correspondence with English firms of repute.

It will be a satisfaction to loyal Queenslanders to know that vegetable, flower, and farm root seeds are grown in the South of England on a large scale, many varieties of both vegetable and flower seeds being exported to the Continent and to the United States of America, some of which reach Australia after two profits have been made on them.

Even aster, ten-week stock, and many other choice flower seeds can be grown to advantage in Essex, where most leading houses have seed farms. Turnip, cabbage, beet, mangel, swede, rape, &c., are grown to advantage in both Kent and Essex, and from there exported all over the world. Cheaper seeds may in some instances be obtained, but better it is impossible to procure; the thing is to get these supplies to Australia, at first cost.

Such seeds as cauliflower are grown in Italy, near Naples, and merchants who require large quantities could purchase direct; but for orders of, say, 28 lb. of a variety, London still offers the best market, as the buyer has the assurance that the large firm from whom he purchases has inspected the growing crop, and is satisfied that it is true to name, and free from sports.

Pictorial flower and vegetable seed packets are printed on a large scale in England. Horticultural sundries, such as flower sticks, wooden labels, &c., can also be purchased in London, of better quality, and at lower prices than is often charged by Continental houses.

Any of the firms mentioned below are open to quote for leading varieties at prices that will bear favourable comparison to those that the trade have been in the habit of paying, but it is as well to note that seed catalogues are printed for sending out to all purchasers, and *genuine seed merchants* who send a detail list of quantities and sorts required can obtain *much better terms*:—

Messrs. Cooper, Taber, and Co., Seed Growers and Merchants, 90 Southwark street, London, S.E.—Large growers of cabbage, beet, mangel, turnip, and general vegetable and flower seeds.

Messrs. Hurst and Son, Seed Merchants, 152 Houndsditch, London, E.—General vegetable and flower seeds, farm root seeds, grasses, &c., and sundries.

Messrs. Watkins and Simpson, Seed Merchants, 12 Tavistock street, Covent Garden, London, W.C.—English flower and vegetable seeds.

Messrs. Carter and Co., Seed Growers and Merchants, Raynes Park, London, S.W.—Vegetable and flower seeds. This firm is wholesale as well as retail.

Mr. William Deal, Seed Grower, Kelvedon, Essex—Large grower of vegetable, farm root, and flower seeds. (Large quantities only.)

Messrs. W. W. Johnson and Son, Ltd., Seed Merchants, Boston, Lincolnshire—Vegetable and farm root seeds.

Messrs. Chas. Sharpe and Co., Sleaford, Lincolnshire—Vegetable and farm root seeds.

Messrs. E. W. King and Co., Seed Growers, Coggeshall, Essex—Vegetable and flower seeds, mangels, swedes, &c.

Messrs. John K. King and Co., Seed Growers, Coggleshall, Essex—Vegetable and flower seeds, mangels, swedes, &c.

Messrs. Toogood and Sons, Seed Merchants, Southhampton—Vegetable and flower seeds, mangels, swedes, &c.

Messrs. Blake and Mackenzie, Ltd., Printers, Islington, Liverpool—Seed packets, pictorials, &c., and seedsmen's requisites.

Messrs. Corry and Co., Ltd., Horticultural Sundries Merchants, Bedford Chambers, Covent Garden, London, W.C.—Wood labels, flower sticks, and general sundries.

Mr. G. H. Richards, Sundries Merchant, 234 Borough High street, London, S.E.—Sundries, sticks, labels, &c., &c.

Above are all English firms of high standing; there are, of course, several others in the wholesale trade.

Messrs. Watson and Scully will be found good shipping agents, and might give buyers the chance of sending several orders in one lot. Their address is—90 Lower Thames street, London, E.C.

In writing to any of the above for prices, quantities, varieties, &c., should always be stated, as well as terms suggested by buyers; it would also be as well to enclose copy of the "Pure Seed Regulations" to enable the sellers to quote for such seeds as will, *on arrival, comply* with the Act.

The Department will at any time give any further information that may be required.

The following are good seed firms in France, Holland, and Italy:—

French—Messrs. Vilmorin, Andrieux and Co., 4 Quai de la Megisserie, Paris—Vegetable seeds and flower seeds.

Messrs. Dupanloup and Co., 14 Quai de la Megisserie, Paris—Vegetable seeds and flower seeds.

Italian—Messrs. Damann and Co., San Giovanni à Teduccio, Naples, Italy—Cauliflower and some flower seeds.

Dutch—Messrs. Sluis and Groot, Enkhuizen, Holland—Large importers of Italian cauliflower seed.

MANURE FOR WHEAT.

The Agricultural Chemist, Mr. J. C. Brünnich, recommends an application of a half to one cwt. of superphosphate per acre, and states that the application of lime would improve the texture of a light, loamy, slightly sandy soil, inclined to be somewhat cementy when dry, and prevent cementing. Limestone screenings or crushed limestone, at the rate of 1 ton per acre, should be used.

CHICORY NOTES.

Quantity of seed required per acre: For roots, from 1 to 1½ lb.; for a green forage crop, from 10 to 12 lb.

Weight of seed per bushel	27 to 30 lb.
Seeds in 1 lb.	335,000
Weight of raw roots per bushel ..	40 lb.
Weight of kiln-dried sliced roots ..	30 lb.
Average produce of roots per acre	5 to 10 tons
Loss in weight by roasting ..	20 to 30 per cent.

Roots may be sliced in a turnip cutter.

Pastoral.

THE STOMACH-WORM IN SHEEP (*STRONGYLUS CONTORTUS*).

By W. G. BROWN, Sheep and Wool Expert, Department of Agriculture and Stock.

Taken as a whole, Queensland is singularly free from serious diseases in sheep as compared with other countries, and even with the other States of the Commonwealth. Those we have are, with one exception, parasitic diseases, the chief of which is stomach-worms. It is the object of this article to put some evidence before the sheep-farmers of the coastal areas which will show them that the only really serious drawback to their keeping sheep successfully is the presence of stomach-worms on much of the country east of the Dividing Range. If we can check or abolish this pest, then there is no country in Australasia where mutton, lamb, and wool can be grown more profitably. The worm is a pest elsewhere on areas such as the Darling Downs, Peak Downs, the Central District, as far west as Jericho, the Maranoa and Roma districts, and in the South of Queensland, as far west as the Warrego River, and the flock-owners are able to deal with it there. I have not the least doubt that it may be dealt with on the coast, for I have been doing so successfully since the end of last year.

All the professional evidence I have been able to find, bearing on this subject, agrees that the life-history of *Strongylus contortus* is known. That being so, we are a long way on the road to success in dealing with the pest. A short *résumé* of this evidence, and some conclusions which are obvious in the light of that knowledge, will help us to deal successfully with the problem in Queensland.

LIFE-HISTORY OF THE STOMACH-WORM.

According to the helminthologists* the female stomach-worms lay their eggs in the bowels. These eggs then pass out of the body in the droppings. They contain living embryos which undergo further development upon reaching moisture in sufficient quantities. The embryos moult three or four times after hatching, this process lasting from three days to four weeks, according as the warmth and humidity are greater or less. The worms then climb the stalks of grass, and await the coming of a suitable host—that is, a cud-chewing animal. The worms are swallowed with the grass, and these, in the process of digestion, make their way to the fourth stomach, there again to lay eggs which pass out in the droppings; and so on, until the host dies, or the worms are expelled. It is known that the young worm is easily killed by cold or dryness, but when it is in the ensheathed or final form it may live for months. It is the ensheathed form which, endowed with length of life, matures in the stomach, and produces eggs, after being taken up by the sheep.

* Helminthologist: One who is versed in the natural history of worms.—Ed.

METHODS OF DESTRUCTION OF WORMS.

All the authorities agree—and it is plain common sense to agree with them—that, as Dr. Theiler, of South Africa, points out, "so long as sheep graze over a pasture infected with stomach-worms, so long will they become reinfected, particularly when the climatic conditions—warmth and moisture—are favourable for their exit from the eggs and development to the unsheathed stage."

There are three ways of clearing the pastures from worms—

1. Burning off grass at a suitable time.
2. Allowing the pastures to lie idle, as far as cattle, sheep, or goats are concerned, for twelve months.
3. Sowing salt at the rate of 5 cwt. per acre on the paddocks infested with worms. Salt is known to be deadly to parasites of all kinds.

All these methods have been tried in one part of the world or other, but only the first and second are practicable in our case.

With the plan of burning off, it is necessary that the holding be cut up into comparatively small areas, for it is seldom that a man can afford to burn off the whole of his grass at one time. It is necessary also, when a paddock has been burnt off, that sheep put into it should be thoroughly drenched. Ten acres is not too small an area where Rhodes and Paspalum are well established. Small paddocks are essential for other reasons, if success in fattening sheep be desired. Too many sheep-farmers in this State have their sheep in paddocks so big that the great bulk of the grass is destroyed by the sharp toes of the flocks, instead of being eaten.

As regards the plan of letting the paddocks lie idle, Dr. Theiler states—"The ensheathed form of the worm has been found alive six months and more after being deposited"; and further, he states, "that a field which has had no sheep, cattle, or goats in it for a year, will practically free itself of worms."

Here again the advisability of small paddocks comes in. A farmer could very well spare, say, 25 to 50 acres in a year out of, say, 500 acres without seriously missing the grass. The paddocks, besides, could be still used to graze horses, without infecting them with stomach-worms. The net result of the above, then, is that it is useless, or comparatively so, to clean a pasture of worms if sheep containing worms be allowed to graze on these clean pastures. It is necessary therefore that, if possible, the worms be killed or expelled from sheep which are to be placed on clean areas of any kind. This conclusion leads up to the various remedies which are being used to expel or kill the stomach-worm in sheep.

TREATMENT OF SHEEP INFECTED WITH WORMS.

An illuminating article appeared in the "American Veterinary Review" for February, 1915, by Mr. I. F. Craig, M.A., M.R.C.V.S., on the "Use of Drugs in the Treatment of Disease caused by Nematode

Worms.'' He treats on the parasites affecting horses, cattle, sheep, &c. I have extracted from that article a number of Mr. Craig's conclusions *in re* sheep. He states—

'' The general symptoms associated with the presence of worms are unthriftiness, debility, and anæmia.'' [To these may be added, as I find it in my experience, severe scouring in the early stages of the attack of worms in sheep.] ''It is possible, too, that mechanical irritation may cause reflex nervous symptoms such as convulsions or epileptiform fits. These troubles may be caused by the actions of toxins formed by helminths (worms). The first object in all treatment of disease is in removing the cause; in this case, nematode (or round) worms. The removal of the worms is brought about by anthelmentics. Those usually employed are: Oil of turpentine, coal tar creosote, carbolic acid, lysol, empyreumatic oils,* naphtholin, thymol santonin, arsenious acid, potassium antimony tartrate, common salt, sulphate of copper, sulphate of iron. areca nut, male shield fern, chenopodium, picrate of potash, kamala, rousso, quassia, oil of cade, carbon disulphide, assafœtida, eucalyptol, benzine, and pomegranate and pumpkin seeds.''

Mr. Craig dismisses many of these, mainly on the score of expense and general unreliability. He says—

'' When dealing with worms in the stomach or intestines, it is necessary to have these organs as empty as possible, by withholding water and food for from twelve to twenty-four hours, to allow the drug, without undue dilution to come into direct contact with the parasites.''

Mr. Craig states further: '' The second part of the treatment consists in counteracting the effect of the worms by a generous diet and a course of tonics. Some of the anthelmintics—such as arsenic and sulphate of iron—will act in this way.''

The use of arsenic has often been stigmatised by the proprietors of drenches which are professedly non-arsenical. All the evidence which comes to hand shows that the basis of all drenches must be arsenical. Here is Mr. Craig's opinion—

'' One reason that the action of vermicides is not very certain, even in the *Strongylidiæ* in the Caecum and the Colon, is that the agents given are partly absorbed before they reach these organs, and are very much diluted in the contents of such organs, which always contain a huge mass of ingesta, even after withholding fluids or food for many hours or days. Hence, arsenic in its solid form is more likely to exert a vermicidal effect upon the worms than some of the more soluble agents.''

This effect is in agreement with my experience. I have tried a number of specifics in the endeavour to find a really good vermicide, and have, as yet, not found one so good as the old arsenic and Epsom salts

* Empyreumatic: Having the taste or smell of burnt animal or vegetable substances.—Ed.

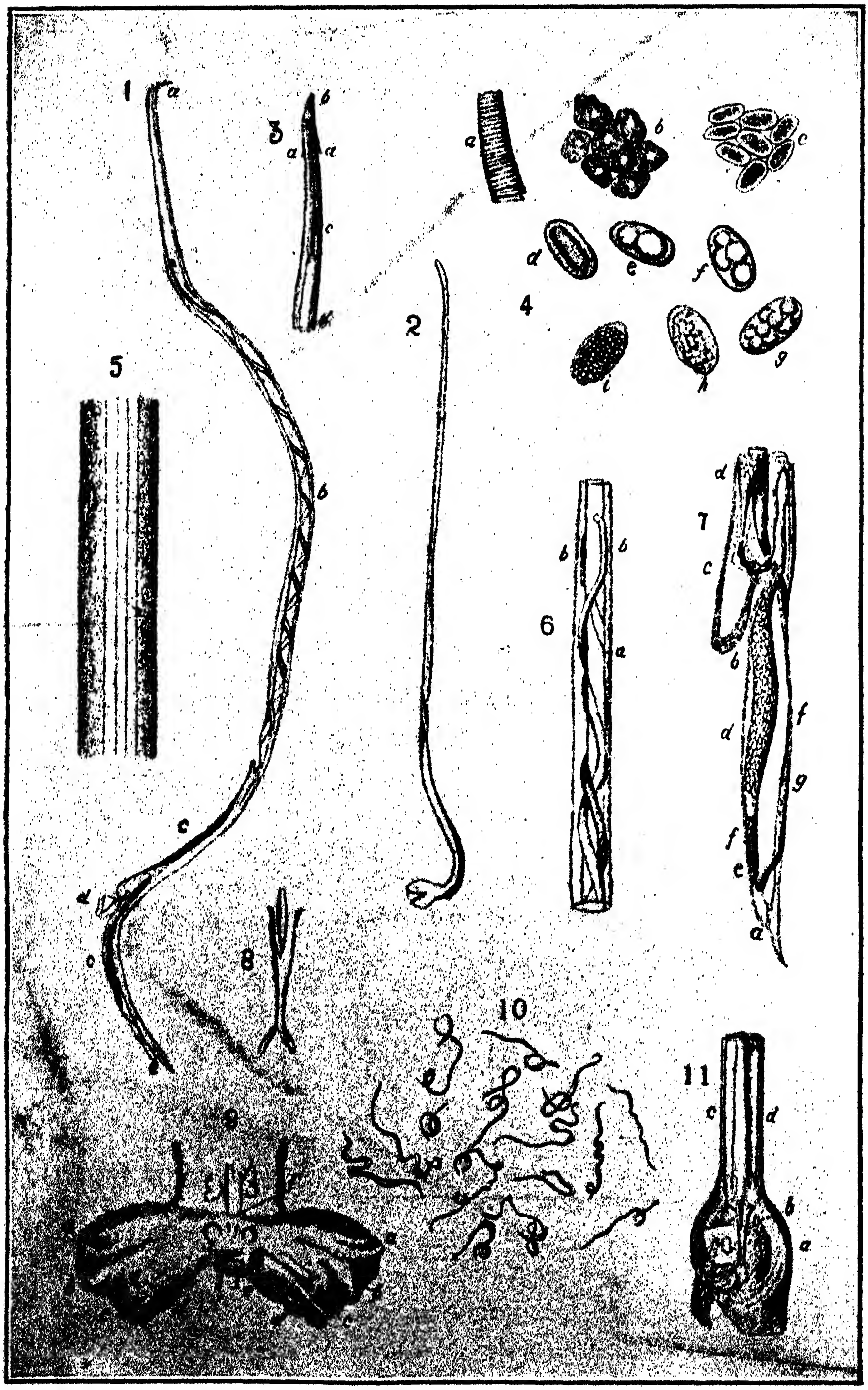

PLATE 1.—STRONGYLUS CONTORTUS. (The Twisted Stomach-worm.)

drench of our grandfathers. Since 1st January, 1915, I have drenched upwards of 25,000 sheep in all stages of infection and in many widely separated districts, and in small lots of not more than 2,000 sheep, and have found that, at the least, the sheep have been prevented from dying through worms.

Some more of Mr. Craig's notes are worthy of reproduction. He says—

"To be of service, anthelmintics (drenches) must be used before acute symptoms set in, or the disease far advanced."

This is really good advice. It is useless to wait until the sheep begin to die before being treated. The signs always appear long before the stage is reached when a good drench is as likely to kill as cure.

"Worms do not multiply indefinitely in the host. The multiplication is outside principally. It is in the young animals grazing on infected pastures that the *Strongylus* cause so much loss. Lambs from three months to nine months old are especially liable."

This is borne out in Australia. In my experience, most of the big losses due to worms have occurred in lambs. It is wise, therefore, to drench lambs, especially weaners, whether they show signs of worms or not—that is, of course, on infected country.

In next month's Journal will appear some of the results of Dr. Theiler's very exhaustive experiments in South Africa, with a short *résumé* of his conclusions. The whole article appeared in the "South African Agricultural Journal" for October, 1912.

[TO BE CONTINUED.]

DESCRIPTION OF PLATE.

STRONGYLUS CONTORTUS.

FIG. 1.—Adult female magnified six times: *a*, head; *b*, ovaries wound around intestines; *d*, papillæ.

FIG. 2.—Adult male magnified six times.

FIG. 3.—Head: *a*, two-barbed papillæ.

FIG. 4.—Eggs highly magnified: *a*, *b*, *c*, *d*, *e*, *f*, *g*, *h*, different stages of development; *i*, egg as it is laid.

FIG. 5.—Skin showing nine of eighteen longitudinal lines.

FIG. 6.—Portion of female: *a*, intestines; *b*, *b*, end of ovary.

FIG. 7.—Caudal end of female: *a*, vulva; *b*, *c*, vagina; *d*, *d*, uteri filled with eggs; *e*, oviduct; *f*, *f*, ovary; *g* intestines.

FIG. 8.—Spicula, enlarged.

FIG. 9.—Bursa expanded to show costæ.

FIG. 10.—Group of males and females; natural size.

FIG. 11.—Caudal end of male: *a*, bursa; *b*, spicula; *c*, seminal reservoir; *d*, intestine.

SETTLERS' FLOCKS ON COASTAL LANDS.

By J. P. CHISHOLM.

It is clear to me that every coast settler should have some sheep—if not for money-making, then from a living standpoint for household meat supply. The matter needs small consideration; the gain is apparent. Fifty ewes well kept will produce fifty lambs, and a wool clip annually. All the ewes may not bear lambs, but some bear twins and others breed twice in twelve months. Fifty lambs a year means a meat supply for a settlers' home—a sheep a week. Ewes not bearing lambs will be good meat—40 lb. to 50 lb. of it, at a cost of, say, 10s. for the sheep (less value of skin), equal to about 2d. for the meat. Skin values vary on the growth of wool. I have before me account sales of skins to 8s. 6d. each. Estimating the yearly increase at fifty lambs from fifty ewes is taking a minimum. With moderately good management, even the worst kind of ewes would do better, and with Lincolns, Shropshire, or more particularly Dorsets, so famous for twins and triplets, a larger increase could be reckoned on.

I may here emphasise my opinion, based on the observations of many years—it is, that the merino sheep is not suitable for coast lands of Queensland and will fail. I refer only to the low coastal belt of country. Anywhere up "on top," I think the merino may do fairly, and the drier the country, in moderation, the better they do; although I doubt if any country is too dry for merinos, so long as there is feed of some kind. They do well on the Lower Murray, in South Australia, on a 7-in. rainfall; and as good a small flock as one could wish for was to be seen in the driest interior, at Bedouri, and for all I know may be there yet. However, I would say—leave the merino to the dry lands.

My experience is with Shrops., Lincolns, Romneys, Dorsets, and, latterly, Border Leicesters. We live 200 miles from the sea, in a 22-in. rainfall in level country. For twenty years breeding sheep have gone from here to all parts of the coast of North Queensland—Mackay, the islands off Bowen, Proserpine, Ayr, the Herbert, and Johnstone Rivers, to Cairns, and many lots to Atherton district. In all the districts I have mentioned, sheep thrive, and, moreover, they thrive in many instances under adverse circumstances due to careless keeping, and in some instances to criminal cruelty and (from a good sheep man's view point) neglect. I know small flocks on the coast lands, unshorn through the seedy period, soiled, with dags hanging to them, and long-tailed unmarked lambs a year old running with their dams. All this, coupled with a total disregard of breeding, and, worse and unkindest of all, often driven into wet yards at night, and often crowded, and yet, despite all this terrible treatment, the sheep are all right. Is any better evidence wanted? Under such conditions, can it be wondered at that merino sheep got footrot and other ailments, and failed?

Most of the coast flocks of my acquaintance are jumble bred of all British breeds, Shrop., Lincoln, and Romney. Our flock here is the same—5,000 to 6,000—a jumble of British breeds. This is not coast country, but it is seedy country. I am often asked why I neglect

particular breeds, I reply that I have my own breed, "Plains sheep," and I show wool returns—once in the last seven years, so low as 10½d. per lb. but all other years up and over 1s., and last year reaching 13¾d. for thirty bales out of seventy-four bales, and at that sale (14th May) not only topping North Queensland, but coming within three of the whole State. I only mention these wool prices as showing that any type of sheep yielding good wool and mutton is a good breed. I give it as my opinion that a combination of breeds produces a sheep more suitable to coastal Queensland than any one particular breed. I mean, so far as my observations go.

Referring to the coast flocks, I have given attention at all times to the health of the sheep, and I have not seen them affected by worms or footrot; and, given freedom from disease, it may be taken for granted the constitution is good. Evidencing this, some seven years ago I bought a small flock of 185, of ill-treated sheep in wet country, near the mouth of the Burdekin River, within a few miles of the sea shore. They had been neglected for years, and I brought them home here, and let them go in the paddocks. A risky thing to do, you may say. It proves my confidence in the soundness of coastal bred sheep. Although that is seven years ago there are many of those sheep here now, and some must be twelve years old. They have been good breeders ever since. There is more Lincoln merino in them than any other breed.

Once the keeping of sheep on coast lands—or any lands except open downs—is mentioned, the reply comes with little variation, "Grass seed will kill them." The fact is, that, given proper management, the vilest black spear grass is harmless to sheep. Here in our paddocks we have miles of the worst grass seed country. The remedy is simple. It is to close shear your sheep just when the grass seed begins to shed, and once or twice in the month or six weeks of the venomous seed period after shearing give the flock a swim through a clean dip or a clear waterhole. I would emphasise the need to have the sheep closely shorn, by machine. It pays every small flock owner to have one of these little hand-turned shearing machines at a cost, I think, of about £3, although the labour of turning is heavier than in the picture.

Close shearing is necessary. The black spear grass seed has a tail that propels the point, and if the tail finds no wool to give it resistance, then the seed simply falls out again, but if odd seeds stick, and get a footing, the swim softens the seed, and the point comes out.

I have often wondered at the good health of sheep when fairly pierced all over with grass seed, and I have often swum woolly sheep, and so saved them, through a bad seedy period. If some seed does get hold in the shorn skin, the growth of wool soon lifts it out, and as the season progresses it dries in the tip, and falls off, leaving the wool clean. In the north the seeding period invariably begins in April, and lasts at the most two months.

As to the period of lambing, the natural time annually is August or September, or may be as late as October. This is all good, as the lambs will be shorn with the flock. Woolly lambs through a seedy period means

dead lambs, but when close shorn they come through unharmed if given the swim once or twice whilst the seed is shedding.

Very often the cry of "worms" is raised when coast sheep are spoken of. I reply that I have not found worms that ordinary care will not combat. Salt, and occasionally some sulphate of iron in the same trough, should always be before coast sheep, and they will soon take a lick of molasses; and even if worms did give trouble, small flocks are easily handled, and dosed, if necessary, in an hour.

An essential to the well doing of sheep is dry foot room to camp, a ridge for choice, and the top of the ridge. Room enough to be comfortable, freedom from noises, more especially the bark of dogs, is necessary for sheep if you would have them do well, and above all quiet handling—no yapping or chasing, but all the time gentle walking and quiet movement; and with that you can take sheep anywhere. In this connection I shall tell a story. A drover camped in cattle country in a dry time with old ewes, shepherded for many months, lost a bunch of 120, and they were not missed. They turned up, however, at a cattle station homestead, thirty miles to the east. In time the drover missed them, and made east in his search. He inquired at the cattle station. "Yes," they said, "the sheep were about here for days."

"Well," said the drover, "you might have known they belonged to somebody, and have put them in the yard."

"We tried to," said the cattle man. "We tried twice, and had everybody on the place out, and dogs besides, and the sheep were too wild. We couldn't yard them."

The case was too bad for words, and the drover went on his way. Here, however, is an illustration of what ill management will do. These old ewes were as quiet as household pets, and a child could have yarded them, anywhere, but the yapping and running, and the dogs, made them unworkable.

It is advisable in all flocks to mark lambs young. The nearer to fourteen days old when marked the better sheep.

A point in sheep keeping is the remembrance of the old adage, "A sheep loveth a short bite," and so it is advisable to put them on to pasture fed down by big stock, or on to burnt country, and if their area is not too large they will keep it down to suit themselves, because they know what is good for them, and will avoid long grass if practicable. Very much of the coast land is good pasture, and in wet times grass grows rapidly, and a home-flock of sheep could be kept on a very small area. I mean, say, five sheep to the acre, so long as the grass is growing, but sheep like a change. They get "paddock stale" and love a scamper round. The heavy wet season weather of the north is bad for sheep carrying much wool, and as the rainy period is January, February, and March, when the sheep are carrying their wool, it is one of the misfortunes of the business. If you have a shed, put the sheep under it on very wet days. Of course, open wool sheep, like Lincoln or Leicester, suffer very little inconvenience from rain, whereas denser woolled sheep would take days to dry; in fact, through a normal wet season anywhere

north of Mackay, they would be wet for months. Hence the need for open wool flocks. Yet the sheltering shed is a small matter; a roof 20 ft. by 12 ft. would easily give comfort to the home flock in heavy wet periods. In the wettest districts of England, where there are more wet days than on Johnstone River, sheep are kept everywhere and without shelter; but there the rain falls mostly in drizzle, and the fleece sheds it, whereas our heavy rainfalls would penetrate and make any fleece sodden. Keeping sheep, and in fact doing many other things in our North country, it is better to produce stock to suit the climate, than expect the climate to suit the stock.

And, moreover, few settlers realise their ideals, the pictures always being a little the best, but yet with ordinary care and management one may get very near perfection, near enough to make comfortable livings from a very small flock of the right sheep.

Concluding, I would say that if more information is wanted by any settler contemplating starting a flock, I shall be pleased to help all I can.

The Plains, Prairie, North Queensland,
1st June, 1915.

[The above corroborates, in the main, the advice given by Mr. W. G. Brown, Instructor in Sheep and Wool, to settlers on the coast, as to the suitability of the coast lands for certain classes of sheep.—Ed. "Q.A.J."]

WHAT IS A HOGGET?

Two graziers in a railway carriage are conversing on market prospects, and one remarks that he expects to get a good figure for his hoggets. When they had left the train, one of the remaining occupants asked his neighbour, "What's a hogget?" "Well, I don't know exactly," was the reply, "but I think it has something to do with a pony when its mane is cropped." "Not at all," interjects the other, "a hogget is a young pig." A new passenger comes in, and it is resolved to leave it to him. "A hogget?" sagely replies the newcomer, "well, you'll have to excuse me, gentlemen, because I really don't know anything about poultry."

What, then, is a hogget? An old cutting from the "Stock and Station Journal" supplies the answer. This is in the form of a letter to the editor and is as follows:—

"SIR,—Someone having asked in the 'Stock Journal' 'What is a hogget?' you say that the editor of the 'Queensland Grazier' says that 'a young sheep is a hogget until its first fleece has been shorn, and after that operation it's a hogget no longer, but some other kind of sheep.'

"According to his definition, a lamb shorn when, say, four months old could never become a hogget. And if it were never shorn, it would remain a hogget all its life. Perhaps he means that the first fleece is a hogget. But that can hardly be the case, because there would be such a wide difference between a fleece taken from a five-months-old lamb and another taken from a sheep eighteen months old, that the same name could not cover both.

"Now, I am going to give you my definition of a hogget. And to start with, I must confess my ignorance as to the literal meaning of the word 'hogget.' But by custom it means (in Australia) a particular kind of sheep. It does not apply to any particular breed or condition, but to 'age.'

"A sheep when born is called a lamb, when weaned, a weaner. A weaner and a lamb, too, at the same time, whether shorn or not. And it is called a lamb until it begins to lose its first teeth, no matter whether it be weaned or shorn, or both, or neither. When its first two permanent teeth begin to show, it is a hogget. When it gets four teeth, it is no longer a hogget. Hence a hogget is a two-tooth, and a two-tooth is a hogget, shorn or unshorn.

"Still, I 'may' be wrong after over thirty years' experience among sheep."

An English dictionary defines a hogget as a two-year-old sheep. In the woollen manufacturing trade, hog fleece, hog wool is described in "Goodchild's Technological Dictionary" as the first shorn fleece of a young sheep. In his work on "Wool," A. Hawkesworth, woolclasser to the Sydney Technological Museum, in 1891, gives "teg," "hog," or "hogget" wool as the first fleece from a sheep that has not been shorn as a lamb, and "shurled hogget" as the first fleece from a sheep after it has been shorn as a lamb.—Ed. "Q.A.J."

THE NUBIAN GOAT.

This animal in colour is black or tan, or a mixture of the two colours, either predominating. The bucks are hornless, and do not have that disagreeable odour which the common buck is distinguished for. In size they are almost as large again as the common goat, and are recognised as the best milkers of any class of goats known, yielding from 4 to 6 quarts a day, and are very docile. They are natives of the State of Nubia, in Egypt, of which State Khartoum is the chief centre. They do not like the cold. Fanciers have tried to acclimatise them in England, but with poor results. In this connection, they should do well in Queensland, as the climate is so mild.

Goats do not contract tuberculosis, thereby the necessity for boiling the milk is eliminated; and when milk is boiled it is also spoiled, for the reason that boiling or scalding changes the composition and also makes it indigestible. It is obvious that goat's milk is highly desirable for children. The milk is very easily digested, even by the most delicate child or invalid. The reason for this is, that the butter-fat is in such minute particles—so small, in fact, that the cream cannot be separated. The butter-fat is all through the milk—*i.e.,* better held in suspension than cow's milk, from which, if left standing, the cream comes to the top.

In England, Europe, and America the milch goat is given the prominence that the animal deserves. Here, in Australia, they are mostly despised, through a lamentable lack of knowledge regarding their value.

The illustrations are taken from Bryan Hook's work on "Milch Goats and their Management."

PLATE 2.—IMPORTED NUBIAN STUD GOAT, ALI BABA.

ABOUT MILCH GOATS.

In answer to many inquiries about the American Milch Goat Association, W. A. Shafor, Hamilton, Ohio, issued the following notice:—

More than twenty years ago an English writer said: "Much has been written and published on the advantage of goats' milk as a diet for young children and persons suffering from wasting diseases, consumption in particular, and many instances have been given in which lives have been saved by its use"; still this valuable article of diet, though better appreciated than it was twenty years ago, is a long way from holding the position it deserves in public estimation generally. A fact has, however been brought to light lately, the result of scientific investigation, which still further enhances the value of goats' milk, and that to an immeasurable degree—a fact that cannot be too widely known, and the importance of which cannot be over-estimated. The numerous inquiries that have been conducted of late years by scientists have elicited what is now pretty generally admitted by medical men—that tuberculosis can be, and is, communicated to human beings through the milk and flesh of cattle afflicted with that disease, the increase of consumption in children being largely attributed (according to Sir Lyon Playfair) to the use of tuberculosis milk. Now, when we consider, on the one hand, the terrible character of this insidious disease, and on the other hand the absolute necessity for the use of milk in the healthful rearing of children, such

a revelation is simply appalling. What makes matters worse, moreover, is that a cow may be suffering from the malady in its earlier stages without the disease being detected. For we are told that "there may be no appearance visible to the naked eye of the action of the tubercular bacillus in a particular animal, and yet it may not improbably be there."

"In view of such a state of things, who will not experience a sense of relief on hearing that goats' milk is entirely free from this element of danger? Professor Nocard states that out of over 130,000 goats and kids that are brought to Paris for slaughter at the shambles of La Villete every spring, the meat inspectors of that city have failed to discover a single case of phthisis. What is far more remarkable, however, he tells us that even inoculation fails to introduce the fatal bacillus into the system of the goat."

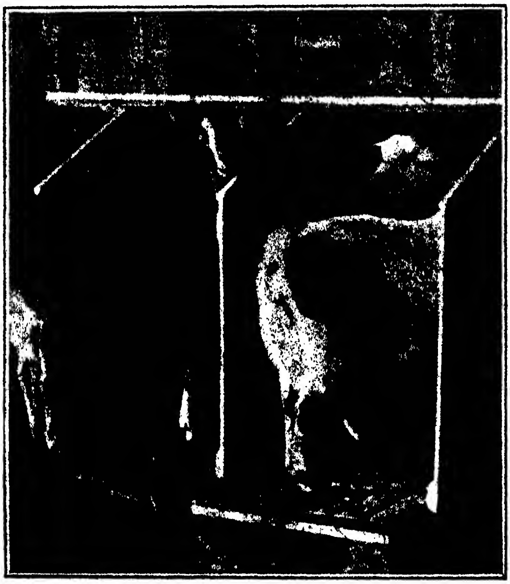

PLATE 3.—THE SAANDEN (SWISS) GOAT.

Another English writer says: "Goats' milk is a grand adjunct to the diet of those who are just beginning to regain strength after long severe illness. A diet consisting largely of goats' milk would restore many a convalescent far more speedily to health without the aid of drugs than anything I know of. A course of goats' milk may often be taken with advantage in the autumn by those who suffer much from cold during the winter months, but who do not care to take cod liver oil."

Many persons who, owing to their circumstances or surroundings, cannot keep a cow could well keep a goat. The first cost is very small, and any little outhouse with a tight roof and ventilated will accommodate it, and much of the waste that is now consigned to the garbage heap could be turned into pure, healthy milk if properly managed, for a goat will thrive where a cow would starve. Yet it must not be forgotten that with more room and greater variety of food better results may be obtained.

BORDER-LEICESTER SHEEP.

By P. R. GORDON.

The Border-Leicester Sheep has long been the favourite sheep in the South Island of New Zealand for crossing on the Merino and for the production of crossbred lambs for export. There are different opinions as to the early origin of the Border-Leicester breed, but the opinion most generally accepted is their being a direct offshoot from the Dishley Leicesters of Bakewell's time, further improved, or at least modified, in type on the Scottish border. What we are now accustomed to call Border-Leicesters are believed to have been taken north from Leicestershire about the year 1767 by the brothers Culley, who held the large farm of Wark and other belongings in Northumberland. No reliable information exists as to when the name Border-Leicester began to be applied to the breed, but no doubt it would be gradually adopted and used to distinguish them from the Leicestershire sheep. The Culleys were intimate friends and disciples of Bakewell, and after they had acquired the sheep naturally set about following the same lucrative enterprise as did their patron. Their sheep soon became known over large districts, and it is not difficult to imagine how the new name would gradually come into use and how it would be, to some extent, necessary to distinguish between them and the local Cheviot sheep as well as those of the parent stock of Leicestershire. These remarks will be followed much easier if it be at once noted that the type of Leicester raised by the Culley brothers was a modified type of the original Leicester, probably as much modified as to be qualified to establish a type of its own, even if left in its native home. The English Leicester of the present day and the Border-Leicester are, to a large extent, different animals. The former have the old characteristic tuft of wool on the forehead, wholly absent in the Border-Leicester. The English Leicester is also, as a rule, lower in the leg than his northern brother, and carries his mutton rather lower. There are also differences in style and coat. At the same time, there are sufficient resemblances between the two breeds to warrant the belief that they came originally from the same stock.

There has always prevailed a good deal of conjecture as to the methods of mating and crossing followed by Bakewell in the evolution of the great breed with which his name will ever be associated. There is just as much speculation *re* the methods of the Culleys. Some have maintained that they stuck pretty closely to the modified type of Leicester they took north to the Scottish border. Others have held that they utilised the Cheviot blood in addition. But the important, substantial fact is, that they succeeded in turning out a new race of sheep of great excellence, which, although no doubt altered to some extent in appearance since, still survive as a monument to their memory.

In 1790, it is reported that the Border-Leicester sheep at Mertown, in Roxburghshire, were even then of as high quality as those owned by the Culleys in Northumberland. No doubt they had been acquired, either from the Culleys or from the original source. Lord Polworth followed Bakewell's system of inbreeding to a great extent, and from the beginning of the last century no single sheep born outside the

flock was used in it for fifty years. But whether the Cheviot played a part in the operations before that period is what a great many of the leading authorities find hard to disbelieve; in fact, many of them prefer to do so. It is generally understood that facility and success in crossing bears some analogy to common ancestry, as we see in Clydesdale and Shire crosses, but in subsequent operations even in those crosses themselves. Be the conjecture as it may, the breed has been sufficiently established to ensure its prepotency in the production of a prime all-round improver of other breeds, to an extent equalled by no other variety of sheep. In judging the breed, greater emphasis has always been put on the head, where one can best tell as to the character, constitution, and breeding of the animal. It should be carried above the line of the animal's back, the crown should be level, the eyes set well up, the face well filled and naturally arched to the muzzle. The jaws should be deep, the eyes bold and luminous, and the nostrils wide, the latter denoting strength and vigour. The colour should be white, but not pale, and a fleshy nose and pinky eyesetting are to be avoided, as suggesting delicacy and softness of constitution. The neck should be fairly strong and muscular, and in the ram slightly arched on top. A strong neck vein is also very important, and it should run naturally into the shoulders, which should be obliquely set to the body, as in the Aberdeen-Angus bull. The back of the sheep should be perfectly level and straight from neck to tail. The loins should be wide and firm to the touch, and the ribs round and wide, with the flesh well carried upon them. This formation has a tendency to make the animal look a trifle leggy or high-standing when shorn, but for a breed which is so largely used for crossing and putting mutton on other breeds it is a point of great importance. The wool should be long and soft and in little locks or curls—which is called "pioly." This "piol" is best seen in sheep which have been only a month or two dropped, the wool being in little clusters of ringlets all over the body. The belly of the sheep should be well covered, although plenty of outstanding sheep show a little openness below. Breeders, however, try to hide this defect as far as possible. With the head and ears, the legs of the sheep should be uniformly covered with nice short white hair. Over and above all, the typical Border-Leicester should have free and easy movement. A sheep may be ever so good under the hand, but unless he walks nicely and keeps his head well up, he has not the best indications of constitution and vigour. As it follows that, to walk well, a sheep must be well set on his legs; the legs should be clean, flat, and flinty, and the hocks naturally bent without being hooked. Above all, the backbone should only be felt through a thick pad of flesh.

What the Border-Leicester has done for the frozen meat trade in New Zealand would be hard to estimate. What they could do in a similar capacity in Queensland would be to speak of even better results. Whether in the production of fat lambs or as high-class wethers, suitable alike for the butcher and freezer, it would be impossible to speak too highly of them. Over a great part of Queensland the rainfall is uncertain, and good seasons do not always follow one another. In some of the other mutton breeds, if the lamb is lost to the freezer through a bad season it is little use as a wether. But the Border-Leicester is an exception, as he not only makes a good lamb in a good season, but if that fails he furnishes into a good wether even if he gets a check in his infancy.

There are in Queensland several who have adopted the Border-Leicester, including some who have had New Zealand experience of the breed.

Photos of a typical ram and ewe of this breed are here reproduced.

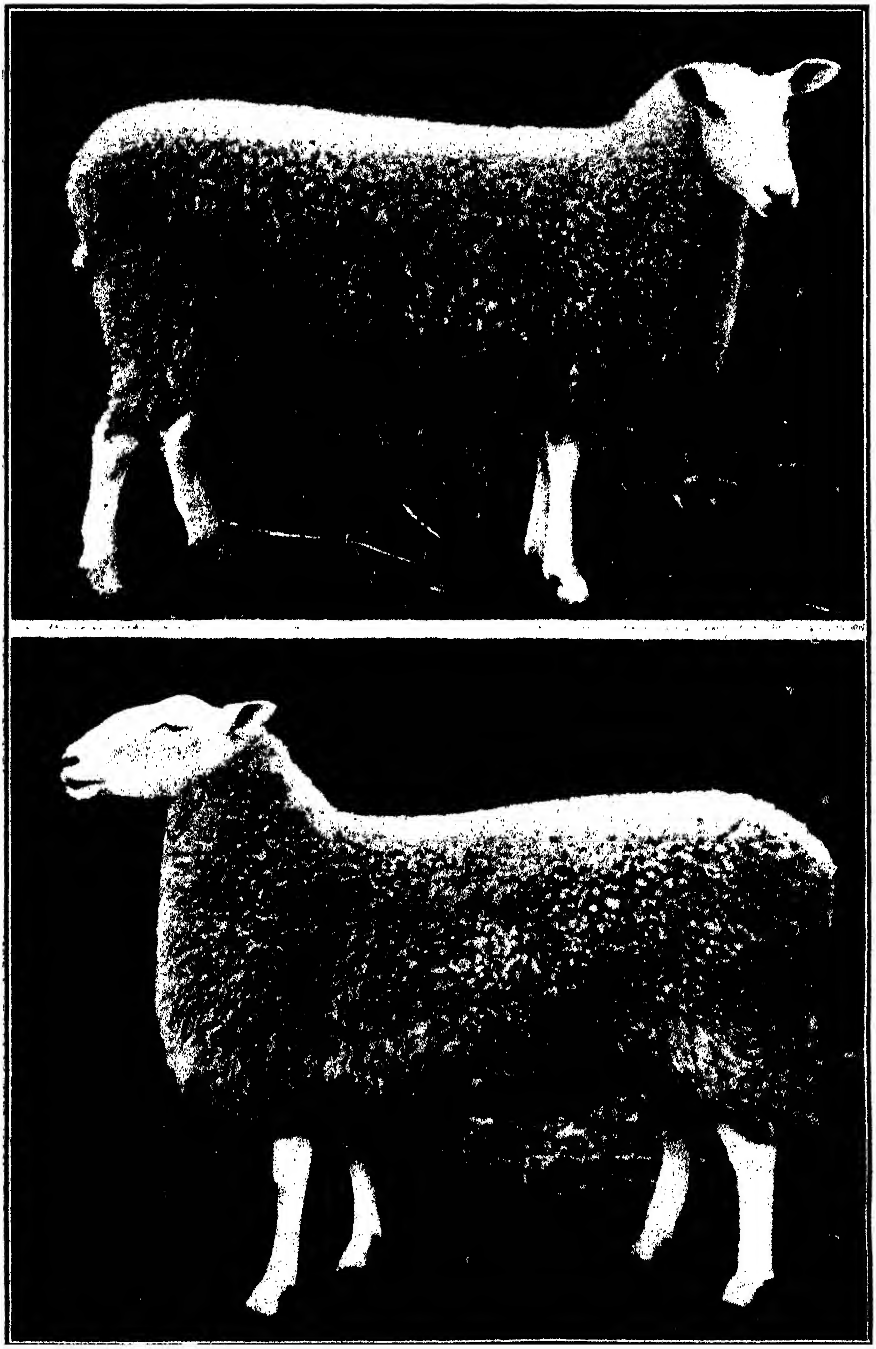

PLATE 4.—BORDER LEICESTER RAM AND EWE.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF MAY, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Noble Dot ...	Jersey	2 May, 1915	666	4·7	36·89	In addition to grazing on natural grasses, the cows received a ration of ensilage throughout the month.
Iron Plate ...	,, ...	21 Feb. ,,	485	5·6	32·11	
Netherton Belle	Ayrshire	23 April ,,	532	4·6	28·82	
Honeycomb	Shorthorn... ...	27 July, 1914	837	6·4	25·57	
Lady May ...	Ayrshire	7 Mar., 1915	707	3·1	25·54	
Thornton's Fairetta	Jersey	27 Mar. ,,	456	4·6	24·71	
Bella ..	Ayrshire	19 Jan. ,,	512	4·0	24·04	
Sweet Meadows	Jersey	28 July, 1914	276	7·2	23·62	
Nina ...	Shorthorn... ...	18 Feb., 1915	553	3·6	23·30	
Burton's Lily	,, ...	17 Nov., 1914	427	4·6	23·14	
Madame Melba	Holstein	8 Sept. ,,	537	3·6	22·63	
Miss Jean ...	Ayrshire	24 Nov. ,,	382	4·9	22·07	
Lady Melba	Holstein	6 Mar. ,,	460	4·0	21·59	
Miss Melba	,, ...	22 Nov. ,,	592	3·1	21·38	
Lady Loch II.	Ayrshire	8 Feb., 1915	431	4·2	21·26	
Violette's Peer's Girl	Jersey	22 Oct., 1914	293	6·0	20·80	
Lady Annette	Ayrshire	26 Dec. ,,	354	4·9	20·46	

SISAL HEMP.

From Messrs. Landauer and Co.'s (London) "Weekly Market Report," dated 21st April, 1915, we learn that during that month more imported quantities of Mexican sisal were allowed to be exported from Progreso (the Mexican port for shipment of sisal hemp), and American operators have been thus able to secure free supplies of this commodity. The price paid is understood to be in the neighbourhood of £25 to £26 per ton c.i.f. New York. Even at this figure, however, the article is of little interest to European buyers, for the reason of the fact that it is impossible to secure freight below £6 to £8 per ton. Meanwhile, values remain, for Mauritius hemp (*Furcrea,* which grows like a weed on waste land in many parts of Queensland from South to North), £33 to £34 for prime, and £31 to £32 for good fair.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, MAY, 1915.

Four thousand and forty-nine eggs were laid during the month. Since the last report Mr. Parker's birds have had a slight attack of warts, and have in consequence fallen off in their laying. Several pens have an odd bird or two in moult, whilst there are five of Mr. Forsyth's, four of Mr. Gill's, and three of Mr. E. A. Smith's White Leghorns in trouble in this direction. A. H. Padman wins the monthly prize with 133 eggs. The following are the individual records:—

Competitors.	Breed.	May.	Total.
Mrs. J. Jobling, N.S.W.	Black Orpingtons ...	128	251
Jas. McKay	White Leghorns ...	109	231
C. B Bertelsmaier, S.A....	Do.	100	217
A. H. Padman, S.A.	Do.	133	214
S. E Sharpe	Do.	88	208
J. D. Nicholson, N.S.W.	Do.	106	208
J. Gosley	Do.	110	193
Mrs Munro	Do.	110	192
A. W. Bailey	Do.	120	186
J. R Wilson	Do.	100	185
T. Fanning	Do.	87	184
A. T. Coomber	Do.	84	171
C. Knoblauch	Do.	95	163
J. M. Manson	Do.	101	162
Dunheved Poultry Farm, Vic.	Do.	79	161
O.K. Poultry Yards	Do.	65	160
J. M. Manson	Black Orpingtons ..	94	160
C. F. Clark	White Leghorns ...	80	160
Kelvin Poultry Farm	Do.	111	157
R. Jobling, N.S.W.	S. L. Wyandottes ..	85	156
E F Dennis	White Leghorns ...	108	156
H. Harnill, N.S.W.	Do.	93	154
E. V. Bennett, S.A.	Do.	106	154
F. Clayton, N.S.W.	Do.	95	145
R. Jobling, N.S.W.	Do.	88	145
Cowan Bros., N.S.W.	Do.	84	137
W. Lyell	Do.	79	133
W. Purvis, S.A.	Do.	77	132
W. Parker	Do.	31	131
E. A Smith	Do.	50	130
Derrylin Poultry Farm	Do. ...	78	127
J. Zahl	Do. (No. 2)	74	127
Moritz Bros., S.A.	Do.	63	119
E. Le Breton	Do	97	119
W. Meneely	Black Orpingtons ...	72	111
T Fanning	Do.	54	108
J. Aitcheson	White Leghorns ...	90	108
Cowan Bros., N.S.W.	Black Orpingtons ...	84	101
Geo. Tomlinson	White Leghorns ...	68	101
G. H. Turner	Do.	63	93
J. Zahl	Do. (No. 1)	57	91
R. Burns	S. L. Wyandottes ..	37	91
R. Burns	Black Orpingtons ..	49	86
K. Pocock	White Leghorns ...	52	83
J. H. Gill, Vic.	Do.	37	81

Competitors.	Breed.	May.	Total.
Loloma Poultry Farm, N.S.W. ...	Rhode Island Reds ...	47	73
W. Lindus, N.S.W.	White Leghorns ..	65	71
J. G. Richter	Do.	48	56
E. A. Smith	Black Orpingtons ...	17	40
W. H. Forsyth, N.S.W.	White Leghorns ...	23	38
S. Chapman	Brown Leghorns ...	24	24
F. Clayton, N.S.W.	Rhode Island Reds ...	1	1
J. R. Johnston	Plymouth Rocks ..	0	0
Totals	.	4,049	6.985

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF MAY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING MAY, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	May.	No. of Years' Records.	May, 1915.	May, 1914.
North Coast.	In.		In.	In.
Atherton	2·11	13	0·60	2·40
Cairns	4·57	27	3·27	6·17
Cardwell	3·69	27	0·47	6·20
Cooktown	2·92	27	0·81	6·27
Herberton	1·60	27	0·87	1·59
Ingham	3·47	22	0·67	7·69
Innisfail	13·25	27	6·74	15·76
Mossman	2·10	5	0·59	5·41
Townsville	1·46	30	0·36	0·60
Central Coast.				
Ayr	1·22	27	0·34	0·39
Bowen	1·43	27	0·13	0·47
Charters Towers ...	0·91	27	Nil	0·20
Mackay	4·19	27	1·19	3·08
Proserpine	6·11	11	1·25	4·06
St. Lawrence ...	1·97	27	0·86	0·28
South Coast.				
Biggenden	2·09	14	0·73	0·96
Bundaberg	2·93	27	1·82	0·96
Brisbane	2·97	64	2·48	3·60
Childers	2·59	19	0·45	1·14
Crohamhurst ...	8·30	22	3·78	6·32
Esk	2·29	27	0·82	2·71
Gayndah	1·74	27	1·60	0·67
Gympie	2·83	27	2·52	1·96
Glasshouse M'tains	2·82	6	7·28	5·27
Kilkivan	2·25	27	1·07	0·40
Maryborough ...	3·08	27	2·18	1·82
South Coast— continued:	In.		In.	In.
Nanango	1·70	27	0·74	1·39
Rockhampton ...	1·70	27	0·84	Nil
Woodford	3·02	27	2·57	3·68
Yandina	4·85	21	3·69	7·91
Darling Downs.				
Dalby	1·48	27	0·52	1·09
Emu Vale... ...	1·12	17	1·63	2·98
Jimbour	1·41	24	0·53	1·08
Miles	1·79	27	1·00	1·02
Stanthorpe ...	1·75	27	2·64	3·81
Toowoomba ...	2·27	27	2·24	3·82
Warwick	1·61	27	4·00	3·93
Maranoa.				
Roma	1·51	25	1·43	1·18
State Farms, &c.				
Gatton College ...	1·96	14	1·96	2·25
Gindie	1·11	13	1·42	0·01
Kamerunga Nurs'y	4·37	23	2·33	3·80
Kairi	...	...	0·60	1·87
Sugar Experiment Station, Mackay	3·81	16	2·12	3·89
Bungeworgorai ...	1·29	2	1·14	1·43
Warren	0·63	2	1·26	Nil
Hermitage ...	0·91	7	1·98	3·49

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for May this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

The Orchard.

PINEAPPLE PROPAGATION.

BY G. WILLIAMS, Cairns.

As at least two of the most esteemed local pines have originated in this State, reputably from sports, there appears rather more than a possibility that further improvement may be effected by raising new varieties from seeds. The smooth-leaf type, three varieties of which are known in this part of the State, admits of improvement in several directions, and this can most likely be accomplished in the manner indicated, particularly where care is exercised in fertilising—a rather slow but not laborious process. Fertilising may be confined to the lower half of the fruit, as it is seldom that seeds are produced beyond the centre. The Northern climate is particularly adapted for the furtherance of this object, but the horticultural possibilities are almost totally unrecognised. The principal drawbacks to this system of propagation, as applied to pines, is their general freedom from fertile seeds, consequently seedling plants are very rarely seen. The same principles, however, apply to pines as to other forms of vegetation, a stoppage or reduction of supplies inducing efforts towards reproduction. Though the practice does not seem readily applicable, still it is borne out in practice, thirty plants being raised from seed contained in six fruits, three rough and three smooth leaf, about 40 per cent. of seed proving infertile. The system entails very little trouble, merely removing that part of the plant, as with suckers for planting in earlier stages, immediately the first sign of fruit production is noted, and replanting in the ordinary manner. The deprivation of young plants of original source of supply from the parent roots has the desired effect, and fertilising of flowers may follow, if so desired as development progresses. The seeds, in appearance somewhat resembling those of an apple, will be found just beneath the skin of the fruit. They should be planted without unnecessary delay—preferably in seed-boxes. Germination is rather irregular, and growth for the first season slow. If young plants are by any means crowded, they should be picked out and replanted in light soil, contained in shallow boxes, at intervals of four to six inches. This will allow for sufficient development until far enough advanced to plant in the open, which, for several reasons, is inadvisable in the early stages. In about twelve months from planting the seed, the young pines will be sufficiently developed, and with good root growth, to plant in permanent positions where the quality can be determined. Three years may reasonably be accepted as a fruiting age. It was originally contended that the fruit of the Northern climate was invariably inferior. This contention, however, has no foundation in fact, as the plants exhibit greater vigour and

productiveness than in colder localities. Inferior types subject to general neglect had evidently created an erroneous impression. The fruit attains a large size under fair cultivation, is of fine quality, and fully flavoured. Smooth-leaf pines have, in one instance, attained a weight of 16 lb.; and pines of 10 to 14 lb. weight are not by any means exceptional. But the very large fruit are of too soft a nature to stand without damage their own weight, and are consequently not adapted for transport. In this direction there is opportunity for speculation and improvement by crossing with the firmer fleshed rough-leaf.

ERADICATING BANANA STOOLS.

"Old banana stalks," says Mr. Brünnich, Agricultural Chemist, "and stools contain very large amounts of fertilising materials, which should be returned to the soil. It would be the greatest mistake to poison such stools, as the quantity of poison required would injure the soil. The stools must be dug out, and allowed to rot on the ground, to return humus and mineral matters to the soil, and a sandy soil requires this more particularly."

The most wasteful methods of utilising lands for banana culture in North Queensland are adopted by the Chinese, and also by some European planters in the North and South. The general practice is to grow bananas on the same land continuously without the addition of manure to supply the loss of nitrogen and potash removed by the plants, and which are so vitally important to the production of heavy crops. The idea seems to be that the plantations are sufficiently renovated by cutting up the stems which have already borne fruit and leaving them to rot round the clumps of plants; but this is not only wholly insufficient, but has the great disadvantage of affording a safe breeding-place for many noxious insects and other pests. What should be done on a well-ordered plantation is, either to replant entirely after the sixth year, thus enabling the land to receive a thorough ploughing and manuring, or to rotate with some other crop. What the rotation crop should be depends on the locality, since what may be a profitable crop in one district may be utterly unsuitable to another.

GRAFTING PAPAW TREES.

Mr. C. Ross, Instructor in Fruit Culture, says that young seedling papaw-trees may be grafted when the stems are about 1 in. in diameter. He suggests the cleft graft as the most serviceable, but the graft must be carefully bound and waxed to prevent moisture penetrating the cleft. The scions should not be thicker than the stock, and these may be got from the side shoots along the old stems of female trees of a good bearing type.

WHITE ANTS ATTACKING FRUIT-TREES.

White ants in fruit-trees in time of drought will make their way from the dead wood into the living, with results fatal to the trees or vines. One remedy for the pest is to discover their under or over ground nest, and pour in bisulphide of carbon, either allowing the fumes to destroy the insects or exploding the chemical. A small quantity of arsenious acid placed in the soil around the tree, without touching the trunk, is also efficacious. Or pieces of pine wood saturated with some white ant mixture, such as Street's, and buried close to the trees will effectually destroy them. Apterite chipped into the soil will destroy white ants and not hurt the trees. A short paragraph in "Garden and Field" for June, 1915, says that "entomologists recommend that the soil be well opened out round the trunk and main roots, and any damaged wood or dead roots carefully cut away, and any scars painted with tar or paint. German potash (kainit), if mixed with the soil round the roots and trunk, 3 or 4 lb. to a large tree, will drive the white ants away, and also act as a manure for the tree treated. All dead wood, stumps, and stakes should be cleared out of infested ground, and any nests that can be found should be burnt out.

BLACK HEART IN PINEAPPLES.

The Ripley Queen pineapple is more subject to black heart than other varieties, and the winter crop is more or less affected by it, the summer crop being usually free. Both rough and smooth varieties do well in the Redland Bay district, but black heart is known there as well as in other parts of the State. The Brisbane district is the best for rough varieties. Wet and cold weather is the principal cause of the disease. However, taking the industry as a whole, the percentage of loss from this cause is not very serious in the year's output, and should not discourage anyone from entering upon the pineapple-growing industry.

GROWING ORANGES AND MANDARINS.

Mr. C. Ross, Instructor in Fruit Culture, says that the main principles to be observed in growing the above fruits are, that varieties such as the Navel orange and Scarlet mandarin, which have a drooping or pendulous habit of growth, should have a stem at least 3 ft. high before the first branches to form the head are allowed to form, whereas, with such varieties as Joppa orange, or Emperor mandarin, which are upright growers, the head should be established near the ground, above the graft. Dense growers require to be well thinned out, and strong, open growers should have extra vigorous shoots shortened back. It should be remembered that lemons produce their crop on lateral shoots as well as on terminals.

Horticulture.

THE CULTIVATION OF SUNFLOWERS.

By A. J. BOYD.

The Sunflower is one of the Compositæ and takes its origin from Central America. It is closely allied to the Jerusalem Artichoke. It will grow in almost any soil, and in any climate. It will withstand cold or heat, drought or rain. It is subject to no disease, and to no climatic disqualification.

SOIL AND CULTIVATION.

Although the plant is not very particular as to soil, it thrives best on deep, well-drained loam. It is advisable to sow early, say at the beginning of September, and ending in February. The quantity of seed required is from 4 to 6 lb. per acre. This should be sown in drills, 5 ft. between the rows, and 10 to 18 in. between plants in the row. The plant grows very rapidly, the crop being usually ready for harvest in three months.

Prepare the land as for corn (maize) and cover the seed no deeper than 2 in. During the growth, the cultivation consists in keeping the land clean and well pulverised, so as to break the capillary pores of the soil, and thus retain the moisture in it. This is a very important point, as the Sunflower is one of the greatest known evaporisers of moisture. When the plant is full grown it will evaporate from 1½ to 2 lb. of water in 24 hours.

The Sunflower is, of course, grown for its seeds, which are very nutritious and contain a large quantity of oil. Thousands of acres in Russia are under this crop, and the yield of oil is estimated at from 40 to 50 per cent. of the total weight of the seeds. It is, in reality, much more, but, in the process of extraction, an important proportion of the oil remains, unfortunately, in the shelly seed envelopes. The seeds form a capital food for poultry, being nearly equal to buckwheat to induce hens to lay. The oil cake which remains after the extraction of the oil is, for feeding and manurial purposes, as valuable as linseed and cotton seed cake. The ash of the stalks, which often run up to 12 or 15 ft., is very rich in potash. Such ashes naturally form a capital manure and stimulant for plants requiring potash. The large leaves form an excellent green feed, greatly relished by all stock. In the large varieties, the flowers, or heads, as they are called, reach sometimes 18 in. in diameter. When the seeds are ripe, they are so thickly set that as many as 2,000 or 3,000 find place in a single head. These seeds are slightly wedge-shaped, and vary in colour, some being quite black, whilst others are grey or white streaked with black.

There are different varieties of the Sunflower, but the most profitable to grow is, undoubtedly, the Giant Russian, of which each head contains from 1,000 to 2,000 and even 3,000 seeds. It is closely followed by the black-seeded variety. It has been grown successfully under a great variety of circumstances and seasons in Queensland, and succeeded as well in the dry West as on the Downs and further North. It was found to do well on forest lands which are not too sticky.

A very necessary condition is, that the plants should be fully exposed to the sun, on which account European growers sow the seed in drills 5 ft. apart, and dibble the seed in at intervals of 3 ft., the plants being afterwards thinned out, because they have such an exuberant growth that they spread their branches and heads in successive layers over each other. This, however, does not apply to the Giant Russian variety, which, as already said, is the most profitable kind to grow commercially. Again, Sunflowers with many heads do not ripen the seed evenly; therefore it is best to cultivate a species which produces only one head to each plant. The Giant Russian is such a variety and may be planted closer than any other, and on suitable soil, and with good cultivation in its young stages, will yield up to 50 bushels per acre. When the plants are about 12 in. high, a slight hilling up benefits them very much.

HARVESTING.

Some growers advise harvesting when the seed heads are quite ripe, but in countries like Russia and America, where the plant is grown on a large scale, the harvesting takes place before the seed is quite ripe, in order to avoid loss by "shattering"—that is, by the shedding of many of the seeds.

A very expeditious way to harvest is to cut the stems close to the ground by means of a horse corn-stalk cutter, and to cart home stems and heads together to the barn or drying shed. There the heads should be dried as quickly as possible by good ventilation and protection from damp, so as to avoid the formation of mouldiness in their fleshy parts and on the seeds. As soon as they are dry enough, they may be threshed with a flail, no special machinery having been put on the market for this work. When threshed, the seeds are winnowed. A simple winnowing machine is easily manufactured on the farm.

A bushel of Sunflower seed varies, according to the kind grown, from 25 to 35 lb., the average being about 30 lb.

The seed yields from 15 to 20 per cent. of oil by cold pressure. The stems may be ensiled and rendered palatable food for stock. The yield of green matter at the Maine, U.S.A., Experiment Station has been from 11,000 to 12,000 lb. per acre, containing from 2,000 to 2,700 lb. of dry matter. The price of Sunflower seed in Australia is about £15 per ton, so that a 40-bushel crop would, at 30 lb. weight per bushel, be worth about £7 10s. There is a good market for the product in this and in the Southern States.

RAISING A YELLOW SWEET PEA.

In an article on this subject, the editor of "South African Gardening" mentions that a fortune awaits the man who can raise a pure yellow sweet pea, but it must be purest yellow, not even a light sulphur colour. Many hybridists are at present working to this end; but, so far, the pure yellow flower has evaded them. This should not discourage anyone from trying his hand at raising such a flower, for Nature may respond to your touch more readily than to the touch of another, and although the yellow sweet pea has not yet been raised, still the possibilities are there; in fact there are many who look upon the introduction of the yellow flower as being only a matter of time. There is not much chance of finding a yellow flower amongst your rows of fixed plants; it has got to be worked for methodically and determinedly, and the only way of raising a flower of this kind is by cross-fertilising two flowers which are likely to produce a yellow when combined. Let us first of all describe the process of cross-fertilisation.

THE TIME TO FERTILISE.

The flower shown at B Fig. 1 is in the right state of development to be crossed, and the one next to it on the stem shows the time at which the anthers should be removed.

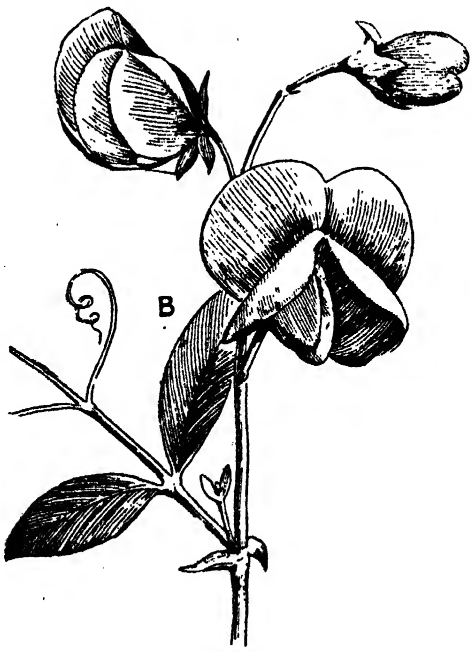

FIG. 1.

CROSS-FERTILISATION EXPLAINED.

Before seed can be produced it is necessary that the flower should be fertilised. Fertilisation is effected by the pollen of the same flower or a flower of the same family coming in contact with the pistil. Some

flowers are self-fertilising, whilst others lend themselves to cross-fertilisation. The sweet pea, however, is a self-fertilising flower—that is to say, the pistil and stamens are both found in the same flower. Therefore, if we want to make a cross it is necessary to prevent self-fertilisation. This is done by taking the flower when it is still quite young and removing the anthers, just as the flower begins to show colour and the standard turns upright. This is easily done by taking the petal which surrounds the keel of the flower—*i.e.*, the bottom petal—between the thumb and the fingers, levering it at first slightly towards you, and finally in a downward direction; you will then find the anthers and the pistil exposed, and if you have taken the flower at a young enough stage the anthers will be solid little yellow lobes supported upon fine stems, both ten in number. The pistil will be seen as a stouter growth turning upwards at the end (see Fig. 2), and if it is examined closely it will be noticed to be covered with a quantity of fine hairs, for the purpose of catching the pollen grains, which in the ordinary course would burst from the anthers. But to cross-fertilise the pea you must remove all these anthers and push the petal, that you have pulled down, back into its proper position; let this stand for two days, and now take a more advanced flower of another variety, again pull down the petal as before, and, holding it upside down, work the pollen of the second flower on to the pistil of the first flower from which you have removed the anthers. This pollen should be a bright yellow colour to be in a proper condition for fertilisation, and when the pistil is more or less covered, the petal that has been pulled down is again allowed to take its natural position, and the flower is labelled and watched.

Some believe in tying the flower in a muslin sack to prevent bees and insects interfering with the cross, by carrying pollen from other flowers on to the one hybridised. But speaking from experience I may safely say that I think this absolutely unnecessary and in fact detrimental to the production of a really good hard seed.

NOTING THE CROSS AND ITS RESULTS.

This is very important, and must be carefully done; the best means is to keep a note of all the crosses made and to label each flower in this way—

A1 × F4. The letter will represent a colour; suppose we make A represent blue and F pink, the numbers will represent the names of varieties used. In this case we might say that Flora Norton Spencer has been worked on to Countess Spencer; these are shown in the notebook in this way: A1 × F1, Flora Norton Spencer × Countess Spencer, and under the heading A × F you should keep all the blue hybridised on to pinks. This gives us a complete and easily followed record of our experiments, and when we have learnt the letters we have assigned to different colours we can tell at a glance what kind of a cross was made, only referring to the book to find out the particular varieties used. When the seed is collected always keep it carefully labelled and sown separately next year.

PISTIL AND ANTHERS.

Fig. 2 shows a flower with all the petals removed; also a section of the flower with anthers, and a section with the anthers removed.

CROSSING TWO SWEET PEAS.

Fig. 3 shows a flower with the anthers removed and pistil developed; shows same flower with the anthers of another flower being brushed against the pistil, which will collect the pollen, and so become fertilised and bear seed.

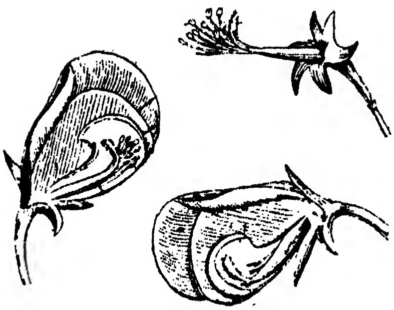

FIG. 2.

FIG. 3.

THE FIRST YEAR AFTER CROSSING.

The results during the first year after crossing will no doubt be very disappointing to those who have never tackled this kind of work before, for the flowers usually consist of ugly blue, maroon, and mauve shades, but seed from these must be saved for another season, and the next time it flowers many colours and forms will be found to result from the same cross. Seed should be saved again from the various plants separately—*i.e.*, the various breaks must be kept to themselves, but flowers showing the same form may be collected together.

Now comes the roguing process, for the seeds that are sown will throw back when grown next year, but if these rogues are carefully taken out, the next year's sowing should give you a practically pure stock and the result of your cross. There may be a few rogues in it, but not many. These, of course, must be carefully removed until the stock is quite true.

VARIETIES TO CROSS.

Opinions differ as to the most likely colours to give yellow, but my experience points to varieties with the colour of Helen Lewis crossed

with dark colours, such as King Manoel, or even scarlet varieties, such as Scarlet Emperor. Another likely cross would be, say, Edith Taylor or a similar variety crossed with a blue. I know these colours are not the one that many experts would recommend as being the most likely to give yellow flowers, but about five years ago out of a great number of crosses I made these gave the nearest approach to yellow. The work of hybridising and roguing looks a big task when it is put into writing, but it is really very simple and intensely interesting. Added to this there is an excellent chance of making quite a considerable sum of money at any moment.

[We asked two sweet-pea growers if they had ever seen a pure yellow sweet pea in Queensland or elsewhere. Both said they had. We have never seen one ourselves. In 1885 Mr. Eckford evolved the Orange Prince variety. The Robert Sydenham is a magnificent orange self, and is described as of the best waved Spencer form. The pure orange yellow has not yet been obtained, although, as far as yellow is concerned, sweet peas of a pale buff or sulphur colour have been raised.—Ed. "Q.A.J."]

SWEET PEA NOTES.

Don't overfeed the plants before the blooms appear.

Manuring with rich nitrogenous manures—sulphate of ammonia, nitrate of soda, and fowl manures—makes a very rank growth which is susceptible to the dreaded "streak" disease. This disease usually appears just at blooming time.

Make the plants hardy. The winter ones will grow slowly until the warm spring months. Do not feed these until then. Use the hoe to keep weeds down.

We have never been troubled with streak. We ascribe our "luck" to the fact that we use very few nitrogenous manures. A little super and well-rotted stable manure well worked into the soil are quite sufficient in most cases to secure good flowers

STRAWBERRY CULTURE.

The strawberry will do well in the vegetable garden if planted out early enough. The soil must be well prepared. Trenching is almost necessary in most soils. Use well-rotted stable manure. Take out drills 2 ft. apart and 1 ft. deep; place well-rotted stable manure and some super at the bottom. Cover over again with soil. Plant strawberry runners on the top of the drills, spacing them 18 in. apart. Set the runners in firmly, spreading out the roots with the crowns just on the surface. May and June are the best months for setting out. If planted early you may expect a crop the same season. No weeds must be allowed to grow near the plants.

As soon as the spring approaches, loosen the soil and spread straw rather thickly around the plants. This will keep the fruit clean and will also act as a mulch for the bed. Don't use a litter that will fill the ground with weeds (the greatest enemy to successful strawberry culture).

Soon after the fruiting season is over runners will appear. All except those required for fresh planting must be cut away.

When rooted the runners may be severed from the parent plant.

Some growers space the strawberry plants in rows 4 ft. apart, and allow all the runners to grow between the parent plants, forming a matted bed 4 ft. wide.

The strawberry responds to irrigation, and most profitable crops are grown under such favourable condition. A north-easterly slope is the best aspect to secure early crops.

No plant is more profitable to grow and none more readily responds to good cultivation than the strawberry.

A small area well tilled and cared for will yield better fruits than large ones allowed to run wild.

The best varieties are Melba, Sunbeam, Royal Sovereign, Edith, and Federation.

[The above useful hints on strawberry-growing from "Garden and Field," as well as those on sweet pea culture from the same source, come just at the time when information on these subjects is constantly being asked for. The manuring of sweet peas is not generally understood by amateur gardeners, who in most cases cause injury, and even disease, to young plants by a too free use of nitrogenous manures with a view to forcing them into rapid growth. In this State, sweet peas have been largely sown in numbers of city and suburban gardens, especially in the South, and the hints given as above, if followed, will have a beneficial effect.—Ed. "Q.A.J."]

CURE FOR WORMS IN HORSES.

Mr. J. F. Keane, Carbeen, writes: "It is more than twenty years since anyone saw a horse of mine that had been a week in my possession troubled with worms. Wherever I am, I always have a few sunflowers growing, even if I have to water them. A handful of the leaves given to a horse once a month keeps him quite free from intestinal worms. I think it is the spicules on the leaf that act as a simple mechanical vermicide." This is a very simple remedy, and one worth experimenting with.

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

BY F. MANSON BAILEY, C.M.G., F.L.S., Colonial Botanist.

Order JUNCACEÆ.

XANTHORHÆA, Sm.

X. media, *R. Br. Prodr.* 288. This species approaches very closely to *X. hastilis, R. Br.*, but it seems necessary to retain it as a distinct species on some small differences. Stem rather short, leaves long, ancipitous. Inflorescence as in *X. hastilis*, but the bracts and perianth segments not bearded.

Hab.: Forest country, North Pine, *E. W. Bick*, April, 1915. Produces a fair amount of resin.

X. quadrangulata, *F. v. M.* This has been collected in different localities by Mr. E. W. Bick (Gympie road, near Brisbane, Sunnybank, Mount Debatable, and Springsure), and said to be abundant in all, so that it would appear to be one of our commonest species. It is a good yielder of resin.

ADIANTUM, Lim.

A. Whitei, *Bail.*, n. sp. (Plate 5.) Rhizome creeping. Stripes and rhachis hispid. Fronds ¾ to 1½ ft. high, mostly bipinnate but slightly tripinnate at the base. Primary pinnæ numerous, always simply pinnate at the end. Pinnules numerous, usually small, ¼ to ½ in. long, the under surface with a few scattered hairs or bristles. Sori not very abundant. Indusia orbicular or somewhat reniform.

Hab.: Kenmore, *J. E. Young* and *C. T. White*, July, 1914; *C. T. White*, May, 1915.

In its hispid nature this new species approaches *A. hispidulum, Swartz*. It is well worthy of garden culture.

Order HEPATICÆ.

Lepidozia lateconica, *Stephani*.

Hab.: Barron Falls, *Mrs. Brotherton*.

Order FUNGI.

Polyporus australiensis, *Wakefield*.

Hab.: Coomera River, on logs. *Tryon* and *White*.

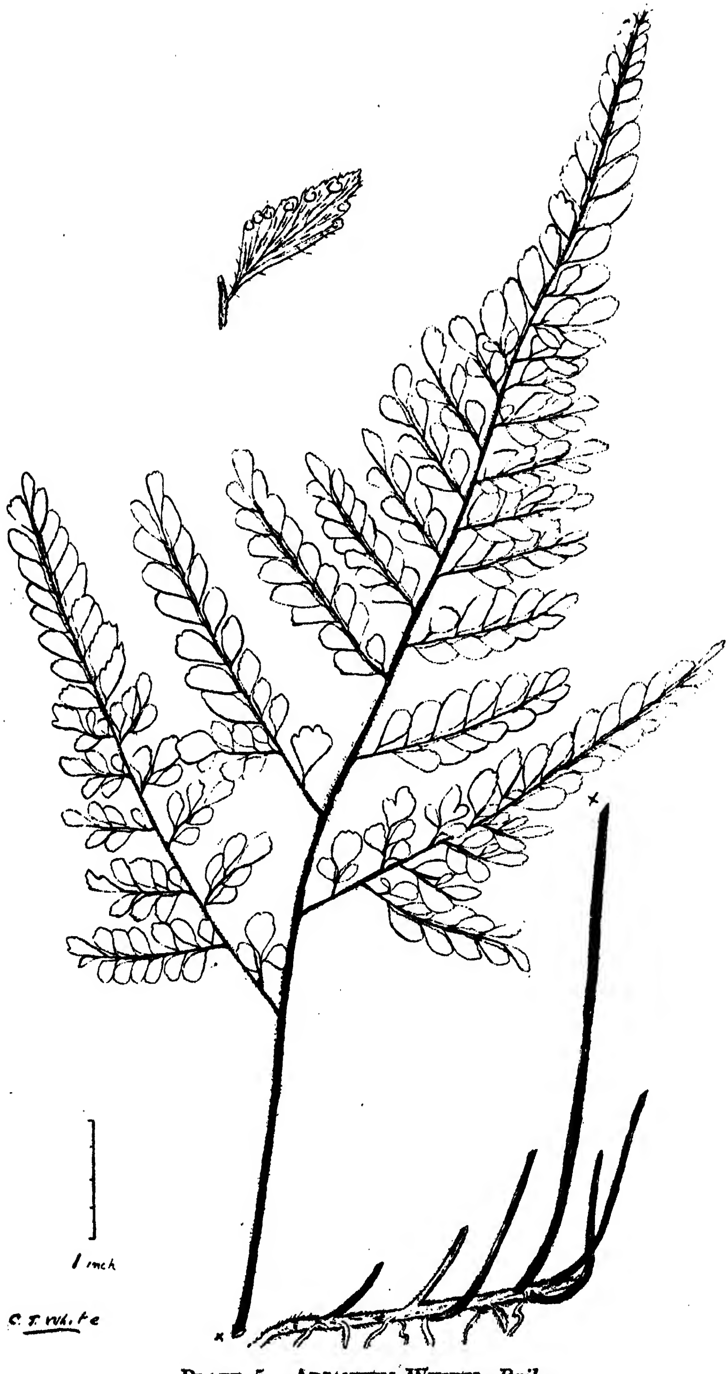

PLATE 5.—ADIANTUM WHITEI, *Bail.*

Plant Pathology.

PANAMA DISEASE OF BANANAS.

The "Journal of the Jamaica Agricultural Society" (December, 1914), referring to the measures taken in the United States of America to stamp out foot-and-mouth disease in cattle and swine, says:—

"A general spread of Panama disease among our bananas here would be of more consequence to us than the wiping out of cattle, &c., in the United States by foot-and-mouth disease. so we ask the support and help of all our readers in preventing the spread of Panama disease where it has occurred and wherever it may occur. We ask our readers for their co-operation, and we particularly ask the co-operation of our branch societies and all their members individually—to learn all they can from the instructors about the symptoms of Panama disease, and to keep a sharp lookout for any possible cases. So many men have been coming from Costa Rica that it would be wonderful if we escaped infection. The germs can be carried on the soles of a man's working boots or on his cutlass if he brings one back with him unknown to the Customs authorities. Infection can be carried from field to field by men walking past an infected root. It can be carried by men taking cocoes or any such roots from an infected field to another field; a cutlass used on an infected plant would certainly carry it to another plant if used again without disinfection.

"Here is what was done by a farmer in an infected district in the United States to save his herd when foot-and-mouth disease broke out. At the first outbreak of this disease he rigidly quarantined his entire premises, allowing no one to enter or leave. The cattle were kept continually in the barns, and the men who cared for them were compelled to wade through a strong disinfecting solution each time both before entering and leaving the stable. In addition, the stalls, floors, utensils, and manure were repeatedly sprayed with the disinfecting solution.

"Where this disease (foot-and-mouth) breaks out among cattle, the entire herd is slaughtered—*i.e.*, every animal on the premises is killed and buried in quicklime, the local State paying half of the cost and the Government half.

"We should do something like this with Panama disease. We can afford to run no risks. Every place this disease breaks out should be thoroughly quarantined, and no one should be allowed to go into or out of the field except by necessity, and then they should wash their hands and feet, or dip their boots in a strong disinfecting fluid; the cutlass used should be passed through fire; all the bananas in the case of a small place should be utterly destroyed and burned; and on a large place a wide area around any infected place should be kept under

quarantine, and fenced with close-mesh wire so that no fowl or pig can go in or out. Pigs would probably carry the disease worst of all. It must be noted that Panama disease is a soil disease, and the germs are in the soil and pass through the soil. It is not the stems of the bananas alone that must be destroyed, but all the roots which may spread 16 ft. around.

"We hope our readers will recognise the seriousness of this matter and not treat it lightly."

With reference to the so-called "Panama disease of bananas," H. Tryon, Government Entomologist and Vegetable Pathologist to the Department of Agriculture and Stock, Queensland, wrote, in general terms, in 1914 on "Root Disease of the Banana in Queensland," as a contribution to an article by us on "The Banana in Queensland" (Bulletin, Queensland Department of Agriculture, 1914). In this he stated as follows:—"The root disease, as hereinafter described, is evidently identical with or is closely related to the malady that attacks with special virulence the Gros Michel variety in Central America, and in some of the West Indian Islands (Cuba, Jamaica, Surinam), and is known generally as 'the Panama disease.'" He does not, as we now learn, favour the view advanced by S. F. Ashby (1913) that this disease is caused by a parasitic fungus belonging to the genus *Fusarium* growing in the tissue, but finds some evidence that the malady is primarily due to bacteria, and that the mycelium of *Fusarium* pervades the spiral vessels, the scene of the activity of these, and for whose growth therein they have "paved the way."

BAIT FOR CUTWORM.

The Superintendent of Entomology, Honolulu, Hawaii, in his report for 1914, dealing with plant pests, advises that, for the destruction of the cutworm, the following may be used with good results:—

Mix Paris green or white arsenic dry with bran; add molasses and just enough water to moisten the mass. The proportions of the ingredients are—Paris green or white arsenic, 1 lb.; molasses, ½ gallon; bran, 20 lb. Place the mixture in rows in the infected field. Frequent rain will make it necessary to repeat the operation. The mixture should be placed between rather than on the plants. Care must be taken to keep domestic animals out of fields treated in this manner.

In the case of houses, bush-houses, &c., infested by

BLACK ANTS,

he says that these may be so reduced in numbers as to give very little trouble for some time by trapping them with sponges moistened with either sweetened water or diluted bouillon, and placed where the ants swarm. After the sponges are covered with ants, they can be dropped into boiling water, cleaned, and the process repeated.

General Notes.

ROSELLA, JAM, JELLY, AND WINE.

To every pound of shell, allow about 1 lb. of sugar. A little water. When making rosella jam it is necessary to separate the shell from the pod. Tie the pods up in a piece of mosquito net, and put them into the preserving pan with the rosellas, sugar, and water. Allow this to stand by the fire for an hour, where it is just hot enough to bring them slowly to a boil. Simmer gently for an hour and a-half or two hours. Then take out the pods, let the jam cool, and then put into preserve jars.

ROSELLA JELLY.

To every pint of juice add 1 lb. of sugar and a little water. When making the jelly there is no occasion to pick them; you can put them in the preserving pan just as you get them, with a little water to every pint of fruit. Allow it to boil for two or three hours, then strain it through a sieve. Put 1 lb. of sugar to every pint of juice, and put this back in the preserving pan, and boil for an hour or until it jellies in a saucer. When cool, fill the preserve jars, and when cold fasten them up securely.

ANOTHER RECIPE FOR JELLY.

One cupful of the pod to 3 pints of the shell. Enough water to float the rosellas. Boil until soft; strain off the juice, and replace in the pan with 1 lb. of brewers' crystals to each pint of juice. Boil for about three-quarters of an hour, skimming well; and make sure, by dropping a little on a plate (before removing it from the fire), that it will be jelly when cold.

ROSELLA WINE.

Put the fruit into a cask that has one head out. Pour boiling water over the fruit; rather more than enough to cover it. Let this stand for about three days; stir now and again. At the end of three days strain the liquor into another cask—this cask to have both heads in. Then, for every gallon liquor take 3 lb. of sugar, and make a good thick syrup of the same. Pour this syrup while hot into the liquor, and stir well. Leave the cask with the bung out until fermentation starts. Should this not occur in, say, twenty-four hours, add a bottle of yeast. Keep this cask in as even a temperature as possible, as this will help the fermentation. In the process of fermentation you will lose some of your liquor. Should it ferment thoroughly, save the liquor that overflows from the bunghole, and put it back in the cask; but should this not suffice to keep the cask full, add a little warm water. When the liquor has almost finished fermenting—say when it stands at 3 degrees density by the Beaumé saccharometer—bung up the cask and leave for three months. Then bottle.

SCARCITY OF POTASH.

Potash being no longer obtainable by fruit-growers and others on the land, Mr. J. C. Brünnich, Agricultural Chemist, advises in the meantime to apply wood ashes and compost, and also limestone screenings, at the rate of about 2 tons per acre, which will liberate some potash from the soil.

A WEATHER GLASS

Which any farm boy can make with a few simple materials, is explained in the "Farmers' Gazette."

Make up the following mixture:—Camphor, 2½ drachms; alcohol, 11 drachms; water, 9 drachms; and 38 grains each of saltpetre and sal-ammoniac. Pour this mixture into a tall, narrow bottle of clear glass, and not less than 7 in. in height. Close the bottle either with a cork or with a piece of parchment tied round its neck. A pin-hole must be made so as not to exclude atmosphere. From day to day the appearance of the solution varies considerably according to the state of the atmosphere. When the conditions are likely to be fine and dry, the solid elements collect together at the bottom of the bottle, and all the upper part is clear. At the approach of rain, the solid particles take on a beautiful feathery formation, which spreads upwards through the clear liquid, making a pretty effect. As the conditions become increasingly stormy, the feathery growth extends till the whole of the interior of the bottle is filled with beautiful sprays. In the case of a very high wind or a sudden electrical outburst, the sprays tend to concentrate at the top of the bottle just below the cork. The storm glass, as a rule, gives good warning of a coming change, usually twenty-four hours in advance, and a study of the variations of the growth will soon acquaint the owner with the meaning of the different phases, so that a good idea of the coming weather may be ascertained. For the most perfect working, it will be found that the storm glass should not be placed on a mantel-shelf, or anywhere near a fire; and, on the whole, the best possible position will be in a window. Here the device can be readily observed, and at the same time it is fairly well in touch with the conditions out of doors.

PASSION-FRUIT PULP.

It should be quite a simple matter, says the "Farm Gazette," to install a small home-canning outfit and pulp passion-fruit. The following recipe has been tried and found successful by the New South Wales Department of Agriculture at its Wagga orchard:—The fruit should be ripe and sweet. Remove the pulp and place in tins, solder down the lids, then exhaust for five minutes in boiling water, solder up hole in lide, and reboil for twenty minutes; then remove and allow to cool. It requires 2 lb. of passion-fruit to make 1 lb. pulp.

TIME DURING WHICH CROPS OCCUPY THE GROUND.

Maize: 4 to 6 months, according to the variety sown.

Potatoes: 8 to 16 weeks, the former period only apply to varieties which mature very quickly.

Barley: 5 to 6 months.

Oats: 5 to 6 months.

Wheat: 5 to 6 months.

All the above periods may be taken as approximate only, and are more or less affected by the variety of the respective crops planted, their environment, and the season experienced.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JUNE, 1915.

Article.		JUNE. Prices.
Bacon	lb.	8d. to 10½d.
Bran	ton	£12 10s.
Butter	cwt.	205s.
Chaff, Mixed	ton	£7 5s. to £8 10s.
Chaff, Oaten	"	£9 5s. to £10
Chaff, Lucerne	"	£9 15s. to £13
Chaff, Wheaten	"	£5 5s.
Cheese	lb.	1s.
Flour	ton	£19 10s.
Hams	lb.	1s. to 1s. 1d.
Hay, Oaten	ton	£16
Hay, Lucerne (Prime)	"	£7 to £11
Honey	lb.	3d. to 3½d.
Maize	bush.	5s. 3d. to 5s. 10d.
Oats	"	6s. 6d. to 7s. 6d.
Onions (Victorian)	ton	£9
Peanuts	lb.	3d. to 3½d.
Pollard	ton	£13 10s.
Potatoes	"	£9 to £10
Potatoes (Sweet)	cwt.	3s. 6d. to 4s. 4d.
Pumpkins	ton	£5 to £5 10s.
Eggs	doz.	1s. 9d. to 2s. 8d.
Fowls	pair	2s. 9d. to 3s. 6d.
Ducks, English	"	2s. to 3s. 3d.
Ducks, Muscovy	"	3s. 6d. to 5s.
Turkeys (Hens)	"	6s. to 8s. 6d.
Turkeys (Gobblers)	"	9s. to 14s.
Wheat	bush.	8s.

VEGETABLES.

Cabbages	per dozen	4s. to 11s. 6d.
Peas	per sugar bag	6s. to 12s.
Beans	" "	9s. to 14s.
Carrots	per dozen bunches	1s. to 1s. 6d.
Cucumbers	per dozen	...
Custard Marrows	"	2s. 6d. to 5s. 9d.
Vegetable Marrows	"	2s. 6d. to 5s. 9d.
Beetroot	per dozen bunches	1s. to 1s. 6d.
Chocos	per quarter-case	2s. to 2s. 9d.
Sweet Potatoes	per cwt.	...
Table Pumpkins	per ton	£4 10s.
Tomatoes	per quarter-case	8s. 3d.
Turnips	per dozen bunches	1s. to 1s. 4d.
Rhubarb	per bundle	1s. to 1s. 6d.
Lettuces	per dozen	...

SOUTHERN FRUIT MARKETS.

Article.	JUNE. Prices.
Bananas (Queensland), per case	15s. to 18s.
Bananas (Fiji), per case	26s.
Bananas (G.M.), per case	...
Mandarins, per case	5s 6d. to 6s.
Oranges (Navel), per case	14s. to 15s.
Oranges (Other), per case	6s. 6d. to 12s.
Passion Fruit, per half-case	1s. 6d. to 7s.
Papaw Apples, per half-case	...
Pineapples (Queens), per case	8s. to 12s.
Pineapples (Ripleys), per case	5s. to 9s.
Pineapples (Common), per case	5s. to 9s.
Tomatoes, per quarter-case	5s. to 6s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JUNE. Prices.
Apples (Tasmanian), Eating, per case	7s. to 10s.
Apples (Local), per case	6s. to 8s.
Apples, Cooking, per case	6s. to 7s.
Apricots, per quarter-case	...
Bananas (Cavendish), per dozen	3d. to 5½d.
Bananas (Sugar), per dozen	2½d. to 4d.
Cape Gooseberries, per quarter-case	...
Cherries, per quarter-case	...
Cocoanuts, per sack	12s. to 15s
Custard Apples, per quarter-case	3s. 6d. to 5s.
Granadillas, per quarter-case	2s. to 3s.
Lemons (Local), per case	3s. to 5s.
Lemons (Italian), per case	9s.
Mandarins, per half-case	4s. to 9s.
Mangoes, per quarter-case	...
Nectarines, per quarter-case	...
Oranges (Navel), per case	6s. 6d. to 7s. 6d.
Oranges (other), per case	3s. 6d. to 6s.
Papaw Apples, per quarter case	1s. 6d. to 2s. 8d.
Passion Fruit, per case	2s. to 4s.
Peaches, per quarter-case	...
Peanuts, per pound	3d. to 3½d.
Pears (Victorian), per case	8s. to 11s.
Rosellas, per sugar bag	1s. to 2s. 6d.
Persimmons, per quarter-case	...
Pineapples (Ripley), per case	1s. 6d. to 3s
Pineapples (Rough), per dozen	9d. to 1s. 6d.
Pineapples (Smooth), per dozen	3s. to 5s.
Strawberries, per tray	...
Strawberries, per dozen boxes	...
Tomatoes, per quarter-case	6s. to 8s. 8d.

TOP PRICES, ENOGGERA YARDS, MAY, 1915.

Animal.	MAY. Prices.
Bullocks ...	£14 to £18
Cows ...	£10 7s. 6d. to £12 15s.
Merino Wethers ...	25s. 3d.
Crossbred Wethers ...	26s. 3d.
Merino Ewes ...	19s. 6d.
Crossbred Ewes ...	23s. 9d.
Lambs ...	23s.
Pigs (Porkers) ...	39s.

LONDON QUOTATIONS.

Article.		JUNE. Prices.
Danish Butter ...	cwt.	144s. to 146s.
Cotton ...	lb.	5·25d.
Hemp ...	ton	£32 15s.
Rubber (Fine hard Parà) ...	lb.	2s. $7\frac{3}{8}$d.
Rubber, Plantation ...	,,	2s. $4\frac{3}{8}$d.
Copra, South Sea ...	ton	£22

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

Date.	May.		June.		July.		August.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·14	5·17	6·31	5·0	6·39	5·3	6·30	5·18
2	6·14	5·16	6·31	5·0	6·39	5·3	6·30	5·18
3	6·15	5·15	6·32	5·0	6·39	5·3	6·29	5·19
4	6·15	5·14	6·32	5·0	6·40	5·4	6·28	5·20
5	6·16	5·13	6·33	4·59	6·40	5·4	6·27	5·21
6	6·17	5·12	6·33	4·59	6·40	5·4	6·27	5·21
7	6·17	5·12	6·34	4·59	6·40	5·5	6·26	5·21
8	6·18	5·11	6·34	4·59	6·40	5·5	6·25	5·22
9	6·18	5·11	6·34	4·59	6·40	5·5	6·24	5·22
10	6·19	5·10	6·35	4·59	6·40	5·6	6·24	5·22
11	6·19	5·10	6·35	4·59	6·39	5·6	6·23	5·23
12	6·20	5·9	6·35	4·59	6·39	5·6	6·23	5·23
13	6·20	5·9	6·35	4·59	6·39	5·7	6·22	5·24
14	6·20	5·8	6·36	4·59	6·39	5·7	6·21	5·25
15	6·21	5·8	6·36	5·0	6·38	5·8	6·20	5·26
16	6·21	5·7	6·36	5·0	6·38	5·8	6·19	5·26
17	6·22	5·6	6·37	5·0	6·38	5·9	6·18	5·26
18	6·22	5·5	6·37	5·0	6·37	5·10	6·17	5·27
19	6·23	5·5	6·37	5·0	6·37	5·11	6·16	5·27
20	6·23	5·4	6·38	5·0	6·36	5·12	6·15	5·27
21	6·24	5·4	6·38	5·0	6·36	5·12	6·14	5·28
22	6·24	5·4	6·38	5·0	6·36	5·12	6·13	5·28
23	6·25	5·3	6·38	5·0	6·35	5·13	6·12	5·29
24	6·25	5·3	6·38	5·1	6·35	5·13	6·11	5·29
25	6·26	5·3	6·39	5·1	6·35	5·13	6·10	5·30
26	6·26	5·2	6·39	5·1	6·34	5·14	6·9	5·30
27	6·27	5·2	6·39	5·2	6·34	5·14	6·8	5·31
28	6·28	5·2	6·39	5·2	6·33	5·15	6·7	5·31
29	6·29	5·1	6·39	5·2	6·32	5·16	6·6	5·32
30	6·30	5·1	6·39	5·3	6·31	5·17	6·5	5·32
31	6·30	5·1	...	...	6·31	5·17	6·5	5·33

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H. M.
6 May	☽	Last Quarter	3 22 p.m.
14 „	●	New Moon	1 31 „
22 „	☾	First Quarter	2 50 „
29 „	○	Full Moon	7 33 a.m.

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

5 June	☽	Last Quarter	2 32 a.m.
13 „	●	New Moon	4 57 „
21 „	☾	First Quarter	12 24 „
27 „	○	Full Moon	2 27 p.m.

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

4 July	☽	Last Quarter	3 54 p.m.
12 „	●	New Moon	7 30 „
20 „	☾	First Quarter	7 9 a.m.
26 „	○	Full Moon	10 11 p.m.

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m. and at its nearest on the 24th at 3·24 p.m.

3 Aug.	☽	Last Quarter	7 27 a.m.
11 „	●	New Moon	8 52 „
18 „	☾	First Quarter	12 17 p.m.
25 „	○	Full Moon	7 40 a.m.

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

[All the particulars given on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced in local newspapers without acknowledgment.]

Farm and Garden Notes for August.

This and the following two months are about the busiest periods of the year so far as work in the field is concerned; and the more activity now displayed in getting in the summer crops, the richer will be the reward at harvest time. Potatoes should be planted, taking care to select only good sound seed that has sprouted. This will ensure an even crop. Yams, arrowroot, ginger, sisal hemp, cotton, and sugar-cane may now be planted. Sow maize for an early crop. If the seed of prolific varieties is regularly saved, in the end it will not be surprising to find from four to six cobs on each stalk. This has been the experience in America, where the selecting of seeds has been reduced to fine art.

In choosing maize for seed, select the large, well-filled, flat grains. It has been shown that, by constantly selecting seed from prolific plants, as many as five and six cobs of maize can be produced on each stalk all over a field. A change of seed from another district is also beneficial. Sow pumpkins, either amongst the maize or separately, if you have the ground to spare. Swede turnips, clover, and lucerne may be sown, but they will have to contend with weeds, which will begin to vigorously assert themselves as the weather gets warmer; therefore, keep the hoe and cultivator constantly going in fine weather. Tobacco may be sown during this month. If vines are available, sweet potatoes may be planted towards the end of the month. In this case also it is advisable to avoid too frequent planting of cuttings from the old vines; and to obtain cuttings from other districts. If grasses have not yet been sown, there is still time to do so, if the work be taken in hand at once. Sugar-cane crushing will now be in full swing, and all frosted cane in the Southern district should be put through the rollers first. Plough out old canes, and get the land in order for replanting. Worn-out sugar lands in the Central and Northern districts, if not intended to be manured and replanted, will bear excellent crops of sisal hemp. Rice and coffee should already have been harvested in the North. The picking of Liberian coffee, however, only begins this month. Collect divi-divi pods. Orange-trees will be in blossom, and coffee-trees in bloom for the second time. As this is generally a dry month in the North, little can be done in the way of planting.

Kitchen Garden.—Nearly all spring and summer crops can now be planted. Here is a list of seeds and roots to be sown, which will keep the market gardeners busy for some time: Carrots, parsnip, turnip, beet, lettuce, endive, salsify, radish, rhubarb, asparagus, Jerusalem artichoke, French beans, runner beans of all kinds, peas, parsley, tomato, egg-plant, sea-kale, cucumber, melon, pumpkin, globe artichokes. Set out any cabbage plants and kohl-rabi that are ready. Towards the end of the month plant out tomatoes, melons, cucumbers, &c., which have been raised under cover. Support peas by sticks or wire-netting. Pinch

off the tops of broad beans as they come into flower to make the beans set. Plough or dig up old cauliflower and cabbage beds, and let them lie in the rough for a month before replanting, so that the soil may get the benefit of the sun and air. Top dressing, where vegetables have been planted out, with fine stable manure has a most beneficial effect on their growth, as it furnishes a mulch as well as supplies of plant food.

Flower Garden.—All the roses should have been pruned some time ago, but do not forget to look them over occasionally, and encourage them in the way they should go by rubbing off any shoots which tend to grow towards the centre. Where there is a fine young shoot growing in the right direction, cut off the old parent branch which it will replace. If this work is done gradually it will save a great deal of hacking and sawing when next pruning season arrives. Trim and repair the lawns. Plant out antirrhinums (snapdragon), pansies, hollyhocks, verbenas, petunias, &c. Sow zinnias, amaranthus, balsam, chrysanthemum, marigolds, cosmos, coxcombs, phloxes, sweet peas, lupins; and plant gladiolus, tuberoses, amaryllis, pancratium, ismene, crinums, belladonna, lily, and other bulbs. In the case of dahlias, however, it will be better to place them in some warm moist spot, where they will start gently and be ready to plant out in a month or two. It must be remembered that this is the driest of our months. During thirty-eight years the average number of rainy days in August was seven, and the mean average rainfall was 2·63 in., and for September 2·07 in., increasing gradually to a rainfall of 7·69 in. in February.

Orchard Notes for August.

THE SOUTHERN COAST DISTRICTS.

The remarks that have appeared in these notes during the last few months respecting the handling and marketing of citrus fruits apply equally to the present month. The bulk of the fruit, with the exception of the latest ripening varieties in the latest districts, is now fully ripe, and should be marketed as soon as possible, so that the orchards can be got into thorough order for the spring growth. All heavy pruning should be completed previous to the rise in the sap; and where winter spraying is required, and has not yet been carried out, no time should be lost in giving the trunks, main branches, and inside of the trees generally a thorough dressing with the lime and sulphur wash.

Where there are inferior sorts of seedling citrus trees growing, it is advisable to head same hard back, leaving only the main trunk and four or five well balanced main branches cut off at about 2 ft. from the trunk. When cut back give a good dressing with the lime and sulphur wash. Trees so treated may either be grafted with good varieties towards the end of the month or early in September; or, if wished,

they may be allowed to throw out a number of shoots, which should be thinned out to form a well balanced head, and when large enough should be budded with the desired variety.

Grafting of young stock in nursery, not only citrus but most kinds of deciduous fruits, can be done this month. It comes in useful in the case of stocks that have missed in budding, but for good clean grown stocks budding is to be preferred.

In the case of working our Seville orange stocks to sweet oranges, grafting is, however, preferable to budding, as the latter method of propagation is frequently a failure. The Seville stock should be cut off at or a little below the surface of the ground. If of small size, a single tongue graft will be sufficient, but if of large size, then the best method is the side graft—two or more grafts being placed in each stock, so as to be certain of one taking. In either case the grafts are tied firmly in place, and the soil should be brought round the graft as high as the top bud. If this is done, there will be few missed, and undesirable Seville stocks can be converted into sweet oranges.

In selecting wood for grafting, take that of the last season's growth that has good full buds and that is well matured; avoid extra strong, or any poor growths.

Seville oranges make good stocks for lemons. In case it is desirable to work them on to lemons, it is not necessary to graft below ground, as in the case of the sweet orange, but the stock can be treated in the same manner as that recommended in the case of inferior oranges—viz., to head hard back, and bud on the young shoots.

Where orchards have not already been so treated, they should now be ploughed so as to break up the crust that has been formed on the surface during the gathering of the crop, and to bury all weeds and trash. When ploughed, do not let the soil remain in a rough, lumpy condition, but get it into a fine tilth, so that it is in a good condition to retain moisture for the trees' use during spring. This is a very important matter, as spring is our most trying time, and the failure to conserve moisture then means a failure in the fruit crop to a greater or lesser extent.

Where necessary, quickly acting manures can be applied now. In the case of orchards, they should be distributed broadcast over the land, and be harrowed or cultivated in; but in the case of pines they should be placed on each side of the row, and be worked well into the soil.

The marketing of pines, especially smooths, will occupy growers' attention, and where it is proposed to extend the plantations the ground should be got ready, so as to have it in the best possible condition for planting, as the thorough preparation of the land prior to planting pines is money very well spent.

The pruning of all grape vines should be completed, and new plantings can be made towards the end of the month. Obtain well-matured, healthy cuttings, and plant them in well and deeply worked land, leaving the top bud level with the surface of the ground, instead of leaving 6 or 7 in. of the cutting out of the ground to dry out, as is

often done. You only want one strong shoot from your cutting, and from this one shoot you can make any shaped vine you want. Just as the buds of the vines begin to swell, but before they burst, all varieties that are subject to black spot should be dressed with the sulphuric acid solution—viz., three-quarters of a pint of commercial sulphuric acid to one gallon of water; or, if preferred, this mixture can be used instead—viz., dissolve 5 lb. of sulphate of iron (pure copperas) in one gallon of water, and when dissolved add to it half a pint of sulphuric acid.

THE TROPICAL COAST DISTRICTS.

Bananas should be increasing in quality and quantity during the month, and though, as a rule, the fruit fly is not very bad at this time of the year, still it is advisable to take every care to keep it in check. No over-ripe fruit should be allowed to lie about in the gardens, and every care should be taken to keep the pest in check when there are only a few to deal with, as, if this is done, it will reduce the numbers of the pest materially later on in the season. The spring crop of oranges and mandarins will be now ready for marketing in the Cardwell, Tully, Cairns, and Port Douglas districts. For shipping South see that the fruit is thoroughly sweated, as unless the moisture is got rid of out of the skins the fruit will not carry. Should the skins be very full of moisture, then it will be advisable to lay the fruit on boards or slabs in the sun to dry; or, if this is not possible, then the skin of the fruit should be artificially dried by placing same in a hot chamber, as the moisture that is in the skin of our Northern-grown citrus fruits must be got rid of before they will carry properly.

Papaws and granadillas should be shipped South, and the markets tested. If carefully packed in cases holding only one layer of fruit, and sent by cold storage, these fruits should reach their destination in good order. Cucumber and tomato shipments will be in full swing from Bowen. Take care to send nothing but the best fruit, and don't pack the tomatoes in too big cases, as tomatoes always sell on their appearance and quality.

THE SOUTHERN AND CENTRAL TABLELANDS.

All fruit-tree pruning should be finished during the month, and all trees should receive their winter spraying of the lime and sulphur wash.

All new planting should be completed, orchards should be ploughed and worked down fine, and everything got ready for spring.

In the warmer parts, grape pruning should be completed, and the vines should receive the winter dressing for black spot. In the Stanthorpe district grape pruning should be delayed as late as possible, so as to keep the vines back, as it is not early but late grapes that are wanted, and the later you can keep your vines back the better chance they have of escaping spring frosts.

Towards the end of the month inferior varieties of apples, pears, plums, &c., should be worked out with more desirable kinds; side, tongue, or cleft grafting being used. In the case of peaches, almonds, or nectarines, head back and work out by budding on the young growth.

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Agriculture.

NOTES ON THE 1914 WHEAT SEASON AND PROSPECTS FOR 1915.

The position in Queensland during 1914-15, as far as the bread cereal is concerned, presented some unique features. First and foremost, the 1914 harvest estimates were somewhat conflicting owing to the appearance of rust in the late crops at the southern end of the Downs, and to the serious check the wheat crops experienced in the spring months along a stretch of the Western line, which extends from Gowrie Junction to the Warra district. However, the first fruits of the harvest served to indicate that in localities favoured by decent weather conditions individual yields of grain left nothing to be desired, and the quality proved to be exceptionally good.

Then the all-important question of aggregate yields and prospective supplies cropped up.

Reckoning on 5½ bushels of grain per head of population, Queensland would require approximately 4,000,000 bushels of wheat to meet

her food supplies. How far was the new crop going to carry on? Stand-over stocks of previous season's grain were very limited and the position in the South was critical. It was only too patent to the most sanguine optimist that only about 1¾ million bushels of wheat would be secured in the State. Where was the balance to come from? New South Wales legislators took an extreme view of the situation in their State and commandeered stocks at 5s. per bushel. Buying in Queensland commenced at 4s. 6d. per bushel, and at no period in the previous history of the State have such extraordinary prices obtained.

Farmers were faced with a dilemma! Obligations had to be met. Drought and high prices for all classes of food on the one hand, and all the uncertainty due to Southern legislation on the other. Some political advisers held meetings and counselled farmers to hold stocks on a rising market. Millers were buying to the utmost limit. Southern buyers, attracted by prime quality and a certainty of profit, purchased over 100,000 bushels, thus seriously depleting stocks. From 4s. 6d., the market quickly worked up to 7s. 6d., and even touched 7s. 9d. The board appointed to control food prices experienced increasing difficulties in making adjustments to meet the situation. In the early part of the year steps were taken by the Government to secure shipments of wheat to ensure a supply of foodstuffs.

Following on immediately after the elections the newly appointed Premier and Cabinet were faced with extraordinary economic conditions and a Wheat Commission was appointed to settle once and for all the complex problems that had arisen.

It is here that cognizance should be taken of "the wheat extension scheme" brought into being by the late Government. Requirements in the way of breadstuffs to meet our own needs of the future had to be faced. A scheme was initiated to encourage farmers to put larger areas under crop and several officers of the Agricultural Department were deputed to canvass different districts to explain its objects, and to arrange not only direct monetary advances to meet individual exigencies, but also to purchase and to make recommendations as to the supply of seed wheat for the 1915 planting season. Here the Government itself came into competition with other buyers, as they were committed to a scheme obligatory upon themselves, which entailed purchasing only the primest wheat obtainable. A wide interpretation was given to the several forms of assistance under this particular wheat scheme, and over 50,000 bushels of wheat were subsequently distributed to farmers. Those participating obtained the grain at cost price (after grading and cleaning) plus 5 per cent. interest; repayment to be made at the end of 1915. Although other factors may have had a bearing on the situation, it can safely be taken for granted that this scheme has resulted in a direct increase of 50 per cent. in the area under wheat in 1915, and at no time in the previous history of cultivation in Queensland has the land been worked up so early in the season. One provision relating to new land intended for cropping distinctively

inferred that such should be ploughed before the 28th February. Such an arrangement, borne out by the experience of Australia's seasons, proved an incentive to others, and in this way cultivation became general. Had the usual monsoonal rains been experienced, it is certain that the stores of moisture which should have found their way into the subsoil would have been sufficient to meet the needs of the new crop. However, dry conditions, which have been so pronounced in the South, seemed to be spreading from the pastoral districts in this State to portions of the wheat-growing belt. Rainfalls were markedly erratic. Lands which were prepared early demonstrated the efficiency of the practice, as the moisture which had fallen was readily absorbed, and as the planting season came round in due course, those favoured fields soon showed a decent germination of grain. Heavy soils which did not possess the property of readily absorbing moisture soon lost in many instances the limited amounts which were precipitated, and once again the heavy black soil country on the Western line and in the Pittsworth district seemed doomed to suffer. Welcome rains were experienced in the latter part of the month of May along a strip of country extending from Toowoomba to Pittsworth on the one side and bearing away to the Warwick district and beyond, practically as far as Goondiwindi. Farmers in these favoured localities who had not already sown their seed in a "dry" seedbed pushed on with seeding operation as rapidly as possible. Their efforts were soon rewarded by the green fields which seemed to spring up as if by magic. In nearly every instance where the rainfall was sufficient a good germination followed, and the prospects in these localities are now of the brightest, assuming, of course, that further rains are experienced to carry on the crops to a successful issue.

FARMING WITH DYNAMITE IN THE WEST INDIES.

On 13th December, 1912, Mr. Harry Vincent told the members of the Trinidad Agricultural Society, in his paper on explosives for cultivating the land, entitled "The Agricultural Revolution by the New Cult": "I read my first paper on the subsoil blasting by dynamite to the members of this society,* and this was followed in September, 1913, by a report on the practical experiments that had been carried out. As, in these trials, only 15 acres had been subsoiled in poor patches covering about twelve districts in the colony, the tangible results were hardly striking, except to those who had witnessed the operations. I have now much pleasure in stating to the members that during the past twelve months 218 acres in Trinidad and Tobago have been thoroughly subsoiled—viz., 177 acres of cocoanut cultivation and 41 acres of cacao. I might here mention that nearly a year ago I subsoiled on the Chaguanas Estate 45 acres of growing cocoanuts, and blasted holes in a 12-acre piece for planting young nuts. These were shortly after planted, and the whole acreage operated on forms now a splendid object lesson

* We are indebted to the report of the "Proceedings of the Trinidad Agricultura Society" for the report of this interesting paper.

for agriculturists. This is the opinion of several well-known planters who have personally inspected it. It is not possible at the present time, though I hope it may be later on, to bring specimens of either the cocoanuts or cacao produced on these areas for the inspection of the members, but I can show ears of corn grown on dynamited and undynamited land. This was grown on land at Manzanilla belonging to Mr. G. A. Frost. The field in question was dynamited last June, and shortly afterwards the corn was planted. After reaping, the dynamited portion showed a yield of 41 barrels to the acre, and the undynamited 19 barrels, and, as the members will see, there is a great difference in the appearance of the ears. I should also mention that the field is planted in cocoanuts and cacao, and the dynamited portion has also tannias, yams, cush-cush and plantains, which were planted shortly after the corn, and are now showing a most vigorous growth. In addition, this was the second crop of corn, as it had already given one before being dynamited. On the other hand the undynamited portion had not been planted before. It was its first crop, and, as no other vegetables were planted, presumably all the plant food went to the corn. Messrs. Cunliffe and Ward have kindly taken photographs of the ears, and from these the members will kindly note the comparison. In the same field Professor Cunliffe has applied some of the fertilisers to two different patches of cacao—one dynamited and the other undynamited. The returns from these trees will be carefully noted.

"The majority of planters with whom I have conversed, while agreeing that dynamite is a great aid to agriculture, evidently think that the cost is prohibitive, seemingly oblivious of the fact that it creates a permanent soil improvement for at least six years (in Canada and the United States they reckon ten years). So it is evidently the primary outlay that frightens them.

"Well, let us take the case of this land of Mr. Frost in Manzanilla. It cost him in the vicinity of 35·00 dollars the acre, because he had it thoroughly subsoiled. Against this prime cost he has to offset 41 barrels of corn at 5s. the barrel (more than covering the cost of the dynamite), the value of the vegetables when reaped, and the general improvement, lasting, as I have previously stated, for a period of five years at least.

"I have just learned from Mr. Davis, the Director-General of the Panama-California Exposition to be held at San Diego in 1914, that they had used over 60 tons of dynamite on their grounds for planting trees, and that they will undoubtedly use a great deal more. He states that it has been found necessary to use dynamite to plant every tree that has been set out on the grounds. At this present moment they have set out over 100,000 trees, and have nearly a million more, which have to be set out during the next nine months.

"Now, here in Trinidad, we are fortunate in having very productive land, and even those soils we call poor would be snapped up with avidity by the Connecticut farmer, or, to come nearer home, the Barbadian peasant, and made to bloom like the rose, by means of the handy-man—

dynamite. As an old Trinidad planter I should like to see in the land of my adoption every agriculturist using the aforesaid handy-man for the undermentioned five operations on plantations here.

"*Firstly.*—If used to clear the land, the operation of removing stumps and breaking boulders can be conducted quickly and economically. With an earth auger a hole is quickly bored under a tree or stump, a charge of dynamite put in, and the stump is out, all broken up so that it can be easily handled. In the case of boulders they can be mud-capped with dynamite and the broken pieces used for roads and the foundations of buildings.

"*Secondly.*—In swampy lands that require draining the planter can make with a punch a line of holes, 2 to 3 ft. apart, where he wishes his drain to be, the depth of the holes to be regulated according to the depth of the drain required, and one or two dynamite cartridges placed in each hole. The primed cartridge in the centre of the line is detonated, the explosion spreads from cartridge to cartridge, and 2,000, 3,000, and 5,000 ft. of drain through mud, slime, roots, and rocks has been dug in the twinkling of an eye, and the land drained and made tillable.

"*Thirdly.*—Cacao, cocoanut, citrus or other fruits are to be planted, and trees to form a wind-break or make shade. Under the old method, the roots were wadded into a spade-dug hole, and the tender rootlets found difficulty in spreading into the hard surrounding earth, especially clay. The up-to-date planter bores a hole, drops in half a cartridge of dynamite, and the soil for many feet is rendered fine and loamy, so that the delicate roots are enabled to reach out and draw sustenance from several times the area that could be reached by the roots of the spade-planted tree; and this planter discovers that his trees grow stronger, fruit earlier, stand dry weather better, and bear much more heavily than those of his neighbour, who did not employ that greatest of all hired men—dynamite.

"*Fourthly.*—Wells have to be dug—a very simple matter with dynamite, and they can be lined with broken rocks or boulders. The roads can be put into shape by blasting out the hill sides and filling in the hollows. If rocks remain from the clearing they can be crushed and used as top dressing for roads.

"*Fifthly.*—Land should be prepared preparatory to planting crops like sugar-cane, cotton, corn, &c.; neither plough nor fork penetrates very deep into the soil, with the result that only a few inches of the surface soil is utilised. Again the auger is put to work, and holes are drilled down into the subsoil at intervals of 10 to 15 ft. over the entire field. Half a cartridge is then dropped into each hole and exploded, the entire field thus rendered mellow to a great depth, the larvæ of injurious insects killed, and the soil, which has been made porous, holds the water of the rains in the many minute channels created by the explosion of the dynamite, and feeds the waters thus held to the thirsty plants in the dry season, when those in the fields prepared in the old fashion are withered and dying.

" In conclusion, I should say that, although both soil and cultivation derive undoubted benefit when the fields in growing crops are dynamited, it is preferable when possible to prepare the land before planting, so as to give the plant every possible advantage during the most delicate stages of its life. While recently operating on a cocoanut plantation amongst old trees, the initial blast (a whole ½-lb. cartridge sunk at a depth of 3 ft.) disclosed at a depth of 14 in. a solid stratum of limestone rock, varying in thickness from 9 in. to 2 ft.—a very solid impediment to the young roots of any tree.

" I still have over a ton of cartridges on hand, and I am prepared to undertake the task of dynamiting land for the planting of cocoanuts at 10 dollars per acre, and for my sugar friends, who look as if they were going to have a good time in the near future, I will thoroughly prepare their heavy clay lands, cracking up the subsoil to a depth of 30 in., at 35 dollars an acre.

" The price sounds big, but when it is remembered that an acre will take between 1,500 and 2,000 plants, and the yield will be increased by at least a ton of sugar, the output will well justify the extra expense. These prices will cover the cost of explosives and my instruction and supervision, the estate providing the labour for holing, &c."—" Tropical Life."

COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

CAULIFLOWERS.

Cauliflowers require a very rich loam, and, like cabbages, a heavy dressing of farmyard manure.

When using from 10 to 15 tons of stable manure per acre, when the ground is being prepared, the following mixture of artificial fertilisers should be applied, per acre, when planting:—

4 to 6 cwt. of superphosphate;
1 to 2 cwt. of sulphate of potash;
2 to 3 cwt. of nitrate of lime;

the latter to be applied in two dressings.

Without farmyard manure use—

6 cwt. of superphosphate
2 cwt. of sulphate of potash
2 cwt. of nitrolim or sulphate of ammonia
} per acre

when planting, and two or three topdressings of 1 cwt. of nitrate of lime each.

CARROTS.

Carrots do best on a rich sandy loam, deeply cultivated and well drained. Stable manure should never be applied immediately before this crop is grown, but rather the preceding year.

Apply per acre—

4 to 6 cwt. of superphosphate;
1 to 2 cwt. of sulphate of potash;
2 cwt. of nitrolim or sulphate of ammonia;

and two topdressings of 1 cwt. of nitrate of lime each.

CELERY.

This vegetable requires a deep, rich, vegetable mould in a moist situation. When preparing beds or trenches, lay in at the bottom about 4 in. of well-rotted stable manure, which is to be well forked in. A heavy dressing of an artificial fertiliser containing from 6 to 10 per cent. of soluble phosphoric acid, 6 to 8 per cent. of potash, and 4 to 6 per cent. of nitrogen, should also be applied, using about 6 cwt. per acre, previous to planting out, and two or three topdressings of 1 cwt. each.

The use of liquid manure and sprinkling with a little salt are also to be recommended.

Instead of the ready mixed fertiliser, the following mixture may be used with advantage:—

3 cwt. superphosphate
1½ cwt. sulphate of potash
2 cwt. nitrolim, or sulphate of ammonia
} per acre

at the time of planting, followed by two topdressings with a mixture of—

1 cwt. superphosphate
½ cwt. sulphate of potash
1 cwt. nitrate of lime
} per acre.

In this case muriate of potash may with advantage replace the sulphate of potash.

CORN (MAIZE).

Corn does best in a deep, sandy loam, rich in humus, and not containing too much clay. This crop makes a heavy demand on plant foods, particularly when grown for **ensilage** or **green fodder,** and farmyard manure used in combination with artificial fertiliser gives the best results. Apply in the drills, when planting, any of the following mixtures:—

2 to 4 cwt. of superphosphate
½ to 1½ cwt. of sulphate of potash
2 to 1 cwt. of sulphate of ammonia or nitrolim
} per acre;

or,

3 to 5 cwt. of bonemeal
½ to 1½ cwt. of sulphate of potash
1 to 1½ cwt. of dried blood, or nitrate of lime
} per acre;

or,

from 3 to 5 cwt. of a fertiliser mixture containing 7 to 10 per cent. phosphoric acid (chiefly water-soluble), from 3 to 4 per cent. of nitrogen, and from 6 to 8 per cent. of potash. Part of the manure, 2 to 3

cwt., may be applied when sowing, and 1 cwt. or more between the drills before hilling.

When maize is grown for grain, the amounts of artificial fertilisers may be varied, and in a rich soil the manure supplying nitrogen left out altogether, using per acre—

3 cwt. of superphosphate;
1 cwt. of sulphate of potash.

In a poor soil about ½ cwt. of dried blood or of nitrolim may be added.

COWPEAS.

This crop is chiefly grown as a green manure crop, but makes a very nutritious hay and chaff, and the pods may be eaten as a vegetable. This leguminous plant prefers a fairly rich sandy loam, which must contain a liberal amount of lime.

Apply per acre from 5 to 6 cwt. of a mixed fertiliser containing from 7 to 9 per cent. of soluble phosphoric acid, and 9 per cent. of potash, or use one of the following fertilisers:—

2 cwt. superphosphate } per acre;
3 cwt. kainit

or,

2 cwt. superphosphate } per acre;
¾ to 1 cwt. muriate of potash

or,

3 cwt. Thomas phosphate } per acre.
¾ to 1 cwt. of muriate of potash or sulphate of potash

One half of the manure can be broadcasted and the other half applied in the drills when planting.

Although as a rule no nitrogen needs to be applied, in many instances, when grown as a green manure on poor, exhausted soils, the addition of a little nitrate of lime, or of nitrolim, in the drills, at the rate of ½ cwt. per acre, may be very beneficial.

WEEDS IN YOUNG LUCERNE.

Provided that young lucerne is well rooted, and has taken a firm hold, it may be cut at about 4 in. from the ground level. This will encourage it to branch out and form a "crown." It is customary to harrow after cutting a young crop choked with weeds, in order to get rid of them, and if the crop is sufficiently established to admit of a light harrowing, preferably with lever harrows—*i.e.*, those which can be adjusted to admit of the tines sloping back at an angle so as not to disturb the young lucerne—it will be found quite satisfactory.

REPORT ON CORN-GROWING COMPETITION, 1914-15.

In making known the awards in connection with the judging of the corn-growing competition, it is essential that the rules under which the contest was conducted should be stated. These read as follow:—

1. This competition will be open to all under the age of eighteen years, who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition containing the following particulars must reach the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than 12 noon on 21st September, 1914:—

(*a*) Full name and address.
(*b*) Age at last birthday and date of birth.
(*c*) Occupation.
(*d*) District in which applicant resides.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which will be supplied free of cost; but one parcel only will be supplied to each competitor during the period of the competition.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot, but in no case shall a plot exceed one-tenth of an acre, otherwise disqualification will be incurred.

The following table shows the length the rows must be to give the exact area according as 4, 5, 6 or more rows are planted:—

Number of Rows 4 feet apart.	Length of Rows in Feet.	Number of Rows 4 feet apart.	Length of Rows in Feet.
4	272 feet 3 inches	8	136 feet 1½ inch
5	217 feet 10 inches	12	90 feet 9 inches
6	181 feet 6 inches	16	68 feet
7	155 feet 7 inches		

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts are to be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield. Duplicate forms for recording all work done and observations made on the plots will be supplied to each competitor.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, ten

cobs of the maize from his crop and forward them to the Principal of the Queensland Agricultural College, Gatton. Labels for this purpose will be supplied.

7. Competitors must notify the Under Secretary of the date when the crop shall have matured and be ready for inspection.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competition will close on the 30th June, 1915, and the prizes will be allotted thus: The competitors will be grouped according to the following districts:—

(1) LOGAN.—From the Coast to Six Mile Creek, by railway line, then in south-west direction to Mount Lindsay, border of New South Wales.

(2) WEST MORETON.—From the Logan boundary on the east to the Main Range, north to Yarraman, south-west to border of New South Wales.

(3) DARLING DOWNS NORTH.—To and including Greenmount, Pittsworth, Jondaryan, Goombungee, Crow's Nest, Spring Bluff, Oakey, Drayton.

(4) DARLING DOWNS SOUTH.—Including Nobby to Wallangarra, Texas, Goondiwindi, Killarney, Freestone, Leyburn, Condamine, Yandina, Darkey's Flat, Clifton, Allora, Millmerran.

(5) MARANOA.—From and including Dalby to Charleville, Mitchell, Morven, Cunnamulla, Mungindi, St. George, Surat.

(6) MORETON.—From and including Nundah, North Pine, Nudgee, Caboolture, Woodford, Kilcoy, Sandgate, Samford, Samson Vale, Humpybong, Maroochy, Eumundi; northern boundary to include parishes of Kenilworth, Maleny, and Conondale, thence south by Mary River.

(7) WIDE BAY AND BURNETT.—From the coast and including Biggenden, Kilkivan, Nanango, Gayndah, Tewantin, Degilbo, Pialba, Howard, Maryborough, Gympie, Bundaberg, Childers, Gin Gin, Isis, Mount Perry, Eidsvold. Northern boundary, 24½ degrees of latitude, Dawson River on west.

(8) CENTRAL QUEENSLAND.—From 24½ degrees of latitude to and including St. Lawrence, Gladstone, Rockhampton, Mount Morgan, Emerald, Jericho, Springsure, Clermont, Aramac, Longreach.

(9) NORTH QUEENSLAND.—North of St. Lawrence to and including Mackay, Bowen, Townsville, Cairns, Cooktown, Atherton, Charters Towers, Ravenswood, Winton, &c.

If there are more than ten competitors in any district three prizes will be awarded for competition in that district; less than ten competitors, one prize only.

The prizes shall be of the following value:—First, £5; second, £2; third, £1.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

The prizes awarded in any district may be increased in number and value by donations from persons, firms, or societies who may be interested in the competition.

10. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

These prizes may be increased in number and value in the same way as is indicated above in connection with the district competitions.

11. The aggregate points will be 100 and the judging will be based upon the following:—

(*a*) Quality of the maize produced.
(*b*) Yield of plot.
(*c*) Notes and records of plot.

12. Arrangements will be made for such of the competitors as may so desire to travel by rail to the Agricultural College during the week when the judging is decided, when instruction in corn-growing and judging will be afforded.

13. The Principal of the Queensland Agricultural College will be the sole judge of the competition, and his decision shall be final.

That the contest created keen interest is shown by the numerous entries received from the various maize-growing areas throughout Queensland, as follow:—

	Entries.	Adjudicated.
Wide Bay and Burnett	85	28
West Moreton	61	29
Darling Downs (North)	38	11
Darling Downs (South)	24	6
Moreton	19	5
Central Queensland	18	6
North Queensland	18	4
Maranoa	24	5
Logan	9	5
Totals	296	99

Unfortunately, during the growing period adverse climatic conditions prevailed over the whole area represented, and this was the means of reducing the yields to such an extent that many of the competitors did not make application to have their plots adjudicated. Several lots of cobs came to hand without any name attached, thus creating some trouble in tracing the owners, while five lots from inspected plots failed to reach us. Two competitors were disqualified through a flagrant breach of the rules. No fewer than fifteen girls entered the lists, two of them securing prizes. It may be pointed out that this contest is a corn-growing and not a corn-cob competition, as erroneously spoken of by several. The scale of points allotted in the two cases would be quite

distinct. The awards were made in accordance with Rule 11, the points given being as follow:—

	Points.
Yield	76
Quality	14
Notes and Records	10
Maximum	100

In regard to yield, 70 points were allotted for a crop of 100 bushels per acre; this made provision for a maximum yield of 108 bushels, which was not exceeded. The crops from the respective plots were harvested and weighed in husked cobs in the presence of an officer of the Agricultural Department. Instead of giving the weight of cobs, I have set out in the award sheet the yield as bushels of shelled corn per acre. This conversion is arrived at by deducting 14 per cent. for core or pith. The cobs, on the whole, were very good, but the unfavourable season was evidenced in many cases by the poorly filled tips. Many competitors made the mistake of forwarding the ten largest cobs for judging, irrespective of quality. This was pointed out to some twenty-five contestants who visited the College during the week the awards were made. Although a number of the competitors gave a fairly full description of the various operations carried out, together with the difficulties experienced, yet the majority contented themselves with simply entering the dates of cultivating, planting, and harvesting. The following are the awards:—

DISTRICT PRIZE WINNERS.

	Points.	£	s.	d.
West Moreton—				
J. R. C. Hart, Blackbutt	86·4	5	0	0
F. A. Bade, Rosewood	65·8	2	0	0
A. M. Bachmann, Marburg	60·7	1	0	0
Darling Downs (North)—				
N. S. Smoothy, Pinelands	77·1	5	0	0
H. W. Abel, Geham	74·9	2	0	0
F. Franke, Cawdor	72·2	1	0	0
Darling Downs (South)—				
Albert Gonchee, North Killarney	72·5	5	0	0
Archibald Gonchee, North Killarney	49·5	2	0	0
A. E. Ernst, Spring Creek, Clifton	44·1	1	0	0
Maranoa—				
F. R. Rowland, Bell	29·7	5	0	0
(Less than ten competitors; one prize only.)				
Moreton—				
R. Rudd, Upper North Pine	56·4	5	0	0
F. Woodward, Samford	49·9	2	0	0
S. R. Hulse, Yandina	48·3	1	0	0
Logan—				
F. M. Birt, Nerang	46·8	3	10	0
E. L. Marshall, Gramzow	46·8	3	10	0
R. A. Tulloch, Veresdale	41·3	1	0	0

	Points.	£	s.	d.
Burnett and Wide Bay—				
A. Fittell, Eel Creek, Gympie	63·9 ..	5	0	0
F. H. J. Hayden, Kingaroy	59·5 ..	2	0	0
E. Hayden, Kingaroy	51·1 ..	1	0	0
Central Queensland—				
R. J. Philp, Mount Larcom	58·1 ..	5	0	0
Isabella Wilson, Yeppoon	57·9 ..	2	0	0
F. Williams, Barmoya	44·4 ..	1	0	0
North Queensland—				
Mary R. Dougherty, Malanda	72·4 ..	5	0	0
J. D. Gellweiler, Kulara, Cairns	58·7 ..	2	0	0
R. Vance, Barrine	47·2 ..	1	0	0

SPECIAL PRIZE WINNERS, ENTIRE COMPETITION.

J. R. C. Hart, Blackbutt (West Moreton) £10
N. S. Smoothy, Pinelands, Crow's Nest (Darling Downs, North) .. £5
H. W. Abel, Geham, Crow's Nest (Darling Downs, North) .. £3

The following is a complete record of the points allotted in the competition:—

WEST MORETON DISTRICT.

Name and Address of Competitor.	Age of Competitor.	Yield. Maximum Yield. 76 points.		Quality. Quality of Grain and Uniformity of Cob. 14 points.	Notes and Records. 10 points.	Total Points. 100.
		Bushels.	Points.			
J. R. C. Hart, Blackbutt ..	16	92	64·4	13	9	86·4
F. A. Bade, Rosewood ..	13	69	48·3	12	5·5	65·8
A. M. Bachmann, Marburg..	10	56	39·2	12	9·5	60·7
W. N. Strasburg, Walloon ..	12	53	37·1	10	7·5	54·6
A. Tapsall, Coominya ..	14	41	37·7	10	4·0	51·7
S. J. Griffiths, Rosewood ..	16	52	36·4	10	5	51·4
W. Peters, Glenore Grove ..	16	48	33·6	9	7	49·6
Alf. Henning, Toogoolawah	14	52	36·4	9	4	49·4
D. A. Logan, Bundamba ..	16	49	34·3	9	5	48·3
Arthur Henning, Toogoolawah	12	49	34·3	9	4	47·3
N. D. Alexander, Ipswich ..	12	45	31·5	10	4	45·5
W. J. Zabel, Minden ..	13	43	30·1	8	4	42·1
J. B. Campbell, Milora ..	13	38	26·6	10	5	41·6
R. S. Turner, Grantham ..	13	34	23·6	10	5	38·8
G. Osborne, Mount Alford ..	13	32	22·4	10	6	38·4
N. H. Bade, Rosewood ..	13	36	25·2	8	4	37·2
F. H. Beduhn, Rosewood ..	12	33	23·1	9	5	37·1
F. Muller, Engelsburg ..	15	32	22·4	8	5	35·4
W. Campbell, Milora ..	12	32	22·4	8	4	34·4
E. Semph, Hatton Vale ..	12	33	23·1	7	4	34·1
C. V. Smith, Ma Ma Creek ..	11	31	21·7	8	4	33·7
H. F. Nitz, Forest Hill ..	17	27	18·9	8	6	32·9
W. J. Muller, Rosewood ..	15	21	16·4	9·5	5	30·9
A. F. Scott, Grantham ..	16	28	19·6	7	4	30·6
H. Rosenberg, Ma Ma Creek	13	26	18·2	7	4	29·2
A. W. Hunt, Dugandan ..	16	20	14	9	4	27
A. H. Evans, Ma Ma Creek	9	17	11·9	8	5	24·9
Bertha Ziebell, Hatton Vale	13	18	12·6	8	4	24·6
J. K. Martin, Helidon ..	13	13	9·1	7	4	20·1

WIDE BAY AND BURNETT DISTRICT.

Name and Address of Competitor.	Age of Competitor.	Yield. Maximum Yield. 76 Points.		Quality. Quality of Grain and Uniformity of Cob. 14 Points.	Notes and Records. 10 Points.	Total Points. 100.
		Bushels.	Points.			
A. Fittell, Eel Creek, Gympie	14	67	46·9	13	4	63·9
F. H. J. Hayden, Kingaroy	14	55	38·5	12	9	59·5
E. Hayden, Kingaroy ..	13	48	33·6	12	7	51·1
W. Norman, Biggenden ..	17	41	29·1	10·5	5	45·6
C. H. J. Strandquist, Murgon	12	40	28	9·5	6·5	44
G. Bubke, Biggenden ..	13	38	26·6	9·5	6	42·1
B. W. D. Wadsworth, Gin Gin	14	38	26·6	10	5·5	42·1
H. Frehmann, Binjour Plateau	13	40	28	9·5	4	41·5
A. F. Birt, Kingaroy ..	16	33	23·1	10	8	41·1
E. C. Andersen, Tingoora ..	14	37	25·9	11	4	40·9
W. Weick, Memerambi ..	10	40	28	9	3·5	40·5
H. V. Horne, Coolabunia ..	14	33	23·1	10·5	6	39·6
W. A. Strandquist, Murgon	10	37	25·9	9·5	4	39·4
L. E. Nystron, Booie ..	13	35	24·5	8	6	38·5
A. Nielsen, Bundaberg ..	14	33	23·1	7	4·5	34·6
J. J. Nielsen, Bundaberg ..	15	31	21·7	8	4·5	34·2
J. Kincaid, Wongarra ..	16	25	17·5	9·5	6	33
W C. Andersen, Tingoora ..	14	23	16·1	10	5	31·1
H. E. Horne, Coolabunia ..	12	23	16·1	12·5	No chart	28·6
R. Buttsworth, Taabinga Village	15	15	10·5	7	8	25·5
M. R. Jackson, Biggenden ..	13	13	9·1	7	6·5	22·6
F. E. Faint, Dallarnil ..	11	9	6·3	4	4	14·3
C. Bischoff, Murgon ..	17	24·6	16·8	No cobs came to hand.	7	..
J. K. Clark, Kalkie, Bundaberg	15	24·5	16·8		5	..
J. V. G. Poulsen, Kingaroy	13	27·5	18·9		6½	..
Allan Kenny, Gayndah ..	13	20·6	14		6	..

DARLING DOWNS (NORTH).

N. S. Smoothy, Pinelands ..	16	83	58·1	11	8	77·1
H. W. Abel, Geham	15	82	57·4	11·5	6	74·9
F. Franke, Cawdor	14	76	53·2	13	6	72·2
L. J. Abel, Geham	12	70·2	49·1	11·5	7	67·6
W. G. Stark, Pinelands ..	14	68·9	48·2	10	5	63·2
A. F. Abel, Geham	14	65·9	46·1	11·5	5	61·6
S. Fitch, Pinelands	15	49	34·3	10	6	50·3
N. Kruger, Bergen	13	41	28·7	8·5	4	41·2
R. Littleton, Pinelands ..	14	39	27·3	8·5	4	39·8
E. M. Schefe, Bergen ..	16	28	19·6	8	9	36·6
I. E. R. Elliot, Cambooya ..	12	29	20·3	10·5	4	34·8

DARLING DOWNS (SOUTH).

Albert Gonchee, North Killarney	17	74·7	52·5	12	8	72·5
Archibald Gonchee, North Killarney	15	44·5	31·5	10	8	49·5
A. E. Ernst, Spring Creek, Clifton	13	42·8	30·1	10	4	44·1
E. W. Wagland, Spring Creek, Clifton	13	33	23·1	9	10	32·1
F. Bishop, King's Creek ..	13	30	21	9	5	35
P. Clegg, Pratten	10	12	8·4	8	6	22·4

MORETON DISTRICT.

Name and Address of Competitor.	Age of Competitor.	Yield.		Quality.		
		Maximum Yield.		Quality of Grain and Uniformity of Cob.	Notes and Records.	Total Points.
		76 Points.		14 Points.	10 Points.	100.
		Bushels.	Points.			
R. Rudd, Upper North Pine	12	52	36·4	12	8	56·4
F. Woodward, Samford ..	17	47	32·9	11	6	49·9
S. R. Hulse, Yandina ..	13	47·6	33·3	11	4	48·3
L. Morrison, Samford ..	11	46	32·2	10	4	46·2
E. Brandenburg, Landsborough	16	37	25·9	9	4	38·9
MARANOA DISTRICT.						
F. R. Rowlands, Bell ..	17	22	14·7	10	5	29·7
R. J. Bullock, Chinchilla ..	9	7	4·9	9	7	20·9
N. C. Bullock, Chinchilla ..	12	8	5·6	8	7	20·6
F. W. Bullock, Chinchilla ..	14	7	4·9	8	7	19·9
J. S. Bullock, Chinchilla ..	16	5	3·5	6	7	16·5
LOGAN DISTRICT.						
F. M. Birt, Nerang	16	41·2	28·8	12	6	46·8
E. L. Marshall, Gramzow ..	13	44	30·8	10	6	46·8
R. A. Tulloch, Veresdale ..	15	39	27·3	7	7	41·3
E. Wolff, Alberton	9	33	23·1	6	4	33·1
W. J. Schlort, Buccan ..	13	27	18·9	5	7	30·9
CENTRAL QUEENSLAND.						
R. J. Philp	16	72·9	51·1	No cobs.	7	58·1
Isabella Wilson, Yeppoon ..	17	62·3	43·4	9·5	5	57·9
F. Williams, Barmoya ..	14	41·9	29·4	10	5	44·4
R. V. Williams, Barmoya ..	11	41·3	28·7	9·5	5	43·2
F. Jones, Raglan	15	31	21·7	11	4	36·7
F. Stobart, Tanby	9	22	15·4	8	10	33·4
J. Williams, Stanwell ..	16	18	12·6	7·5	8	28·1
NORTH QUEENSLAND.						
M. R. Dougherty, Malanda, Cairns	16	82	57·4	8·5	6·5	72·4
J. D. Gellweiler, Kulara ..	13	61	42·7	12	4	58·7
R. Vance, Barrine	13	46	32·2	9·5	6·5	47·2
F. G. Reid, Peeramon ..	15	44·3	31	7·5	7	45·5

G. B. BROOKS, Acting Principal,
Adjudicator.

REFINERY LIME REFUSE FOR THE LAND.

Mr. J. C. Brünnich, Agricultural Chemist, says that the lime refuse of a sugar refinery makes a good substitute for limestone screenings, and should be applied at the rate of 2 tons per acre. With respect to artificial fertilisers, it is always advisable to vary such as are applied, from season to season. Apply one year, bonedust with an addition of potash; other years, meatworks manure and potash; and, again, superphosphates, nitrolim, and potash.

Pastoral.

THE VALUE OF GOAT'S MILK.

There is a widespread belief that goat's milk has some peculiar flavour, rendering its use for domestic purposes unpleasant. This impression, however, has been gathered in Switzerland, and apparently arose from some peculiarity in the feeding. In Switzerland goats are allowed to wander at will, and as they have a fancy for strange and pungent herbage, the flavour of this food is imparted to the milk. But this will not be found to affect the milk of goats in this country. Here it has no flavour to distinguish it from cow's milk, except perhaps its superiority in sweetness and creaminess, but if they eat young gum leaves or any plant with a pungent odour, the milk will be tainted. In Bryan Hook's book on milch goats the analyses of goat's and cow's milk is as follows:—

	Goat's Milk. Per Cent.	Cow's Milk. Per Cent.
Water	83·21	87·56
Butter fat	7·30	3·63
Casein	4·18	
Milk Sugar	4·10	8·81
Ash	1·21	
	100·00	100·00

Thus, it will be seen that while the cow's milk contains 12·44 per cent. of solids, the goat's milk can boast of 16·79 per cent. Moreover, in the most important ingredient, *i.e.*, butter-fat, the goat shows a percentage nearly double that of the cow. The most important of all the qualities of goat's milk, especially in relation to its adaptability to the feeding of infants, is its immunity from the danger of carrying the germs of tubercular disease, thus obviating the necessity for boiling, the goat not being liable to tuberculosis. Goat's milk is very much easier of digestion than that of the cow, the reason being the extreme minuteness of the fat particles.

The making of butter from goat's milk is an important one to the goatkeeper. Goat's butter, though, perhaps, not superior in flavour to that of cows, is at least as good, and has, moreover, the advantage of freedom from the germs of tuberculous disease.

The methods in common use for churning fail to extract anything like the quantity of butter which analysis shows the goat's milk to contain. Of several methods tried for the production of goat's cream and butter, the best, according to Mr. Hook, is the ordinary Devonshire one of scalding the milk, as in this way greater time can be allowed for the cream to rise. The milk, having stood in the tin pan for twelve hours, is placed upon the stove until a ring appears upon the wrinkled surface of the cream of the size of the bottom of the pan. When this appearance is noticed, and just before the milk boils, it must be taken off and allowed to stand in the dairy for another twelve hours,

when it is skimmed, and the milk will be found sweet and drinkable. The cream thus obtained having soured in the cream bowl, can be whipped into butter in a few minutes with an ordinary egg-whisk. This butter is absolutely white and might be mistaken for lard, and as this appearance is disliked by many persons, a little butter-colouring may be added.

YIELD OF BUTTER.

From a goat yielding two quarts of milk daily, 17 oz. of butter will result from a week's milking. This seems a small quantity, but it must be remembered that the remaining skim milk, amounting to 3½ gallons, would be of a quality far superior to that obtained were the butter more perfectly extracted, and would be little poorer than ordinary new cow's milk.

Thus, it will be seen that a single goat, in full profit, would supply both butter and milk enough for the consumption of three persons.

GOAT'S MILK CHEESE.

Another use for the superabundant produce of the goat is the manufacture of cheese, which, by the use of rennet, is an extremely easy operation, and yields a very excellent result nearly resembling Stilton. The cheese will, however, not keep more than four or five weeks. The recipe is as follows:—The milk having been warmed to about the temperature it has when fresh drawn, the rennet is added, and quickly stirred in, and the milk allowed to stand for an hour, when it will have cooled, and set into a firm curd. This curd having been broken up with a fork, a kettle of water, rather hotter than the hand can bear. is added, and the whole well stirred. In a few minutes, the washed curd will have settled, and the whey and water may be strained off. The curd is then put into a butter cloth under pressure, the cloth being changed, the pressure increased, and the curd turned over every day. In three or four days the cheese will be made, and only requires to be ripened for ten or fifteen days on a shelf, being turned over daily.

The curd may be produced by the judicious application of heat, without the use of rennet at all, and this method, being inexpensive, is most desirable.

In Switzerland, no rennet seems to be used, the peasants turning the milk by placing it in huge cauldrons upon the fire.

THE GOAT'S RATIONS.

A full-grown goat at liberty will collect a wonderful amount of food in a short time, leaving its mastication to be accomplished at leisure. This hastily gathered food is stowed in a stomach on the left side, and a goat that has laid in a good stock of material for rumination presents an amusingly lop-sided appearance.

For goats which are constantly stalled, the morning ration consists of a double handful of bran (dry), to which should be added lucerne chaff, At midday, an armful of lucerne hay or coarse grass. The evening meal is the same as that for the morning. Grass is the natural staple diet of an animal at pasture, but the goat's love of change leads it to eat

leaves and twigs which come within its reach. The grasses most relished are those of a hard, wiry nature. Goats seldom suffer from eating poisonous plants, as they instinctively avoid noxious plants.

RETURNS.

Suppose a goat to yield daily 4 pints of milk. At 6d. per quart (the price of cow's milk in Brisbane) this amounts to about £1 10s. per month, whilst one-third of water may be added to the milk, and even then it is richer than cow's milk (excepting for the making of junket).

THE COST OF RATIONS.

This, as per quantities of feed above stated, amounts to about 7s. 6d. per month, when feed is at ordinary prices. How does the cost of producing goat's milk compare with that of cow's milk. For a family of four, with economy, 3 pints daily of cow's milk, at 6d. per quart, is sufficient, the cost for a month being £1 2s. 6d. But the goat gives 4 pints daily of a value of £1 10s. per month. The cost of feeding a cow having access to pasture is, on an average, £3 per month; of a goat 7s. 6d.

Then, as to butter, as before, with economy, a family of four will use about 2 lb. per week, at a cost of 2s. 2d. per lb. The goat produces over 1 lb. per week plus the milk, which the purchaser of butter does not receive.

Taking all the advantages claimed for the goat, it may well deserve the name of the " poor man's cow."

LAMBING EWES DYING.

A correspondent lately wrote to the Chief Inspector of Stock, Brisbane, stating that some lambing ewes had died, that others appeared to be sick, walking round in one spot as if giddy, and that one fat ewe had tuberculous ulcerations, or what appeared to be such, on the intestines, the liver, moreover, being pale.

The District Inspector of Stock at Killarney, Mr. H. C. Hawthorn, advised that the sheep be placed on better feed, if possible, and be given salt. Mr. W. G. Brown, Instructor in Sheep and Wool, to whom the case was also referred, stated that the trouble is a very common one just now, and is directly attributable to the dry condition now prevailing over the greater part of Queensland. It is necessary that ewes about to lamb should have laxative food, such as green grass, lucerne, or any other growing fodder. In the absence of these, it is often advisable to drench the ewes with a 3-oz. dose of Epsom salts in the proportion of 6 lb. of Epsom salts to 10 gallons of water. If the sheep have access to salt, all the better, but add 5 or 6 lb. of Epsom salts to one bag of, say, 180 lb. salt.

The nodules, or apparent ulcerations, are due to the nodule worm (*Oesophagostona columbianum*), and these do not cause serious injury to the health of sheep. Tuberculosis is rarely found in sheep—certainly not in Australia.

DISEASES OF CATTLE.

Blackleg.—All young cattle, where blackleg has once made its appearance, should be inoculated with blackleg vaccine, which can be obtained, with full particulars, from the Government Bacteriologist, Stock Experiment Station, Yeerongpilly.

Disease of the Eye in Calves.—The most common disease that affects the eye, in this State, is blight, and the treatment recommended is as follows:—Nitrate of silver, 5 gr.; distilled water, 1 oz. This lotion should be painted onto the affected eye daily with a feather.

Footrot in Cattle.—This may be brought about in several different ways. First of all, the cause should be found, and at once removed. The most common cause is sand and dirt becoming inserted between the hoofs and causing scalding. If this is the cause, the foot should be thoroughly washed in warm water; then, a pad of cotton-wool should be soaked in the following solution, placed between the hoofs, and kept in position with a bandage:—Bichloride of mercury, 1 dr.; water, 20 oz. After the disease has disappeared, the cleft of the foot should be filled with Stockholm tar, and the animal kept as dry and clean as possible.

THE STOMACH-WORM IN SHEEP.

[CONTINUED FROM JULY NUMBER.]

BY W. G. BROWN, Sheep and Wool Expert, Department of Agriculture and Stock.

In last month's issue of this journal mention was made that Dr. Theiler, C.M.G., Director of Veterinary Research to the South African Government, had made a number of experiments with the object of finding a good vermicide.

The results of these experiments were given in the "South African Agricultural Journal" for October, 1912.

It is not proposed to give the whole set of tables, but only some of Dr. Theiler's conclusions on the results of his experiments.

The first part of the article gives the life-history of the wire (or stomach) worm on much the same lines as was given in this journal last month, so that it is not necessary to reproduce it. Dr. Theiler says (p. 574)—

"It must be stated that even the best medicine does not kill all the worms in the stomach of all sheep, and there are always some parasites which escape. Accordingly, a clean pasture will, in time, become reinfected, particularly in a moist warm season. It is here that the sheep farmer will be able to show his skill in handling his flock, so that during these periods the animals do not remain too long on the same pasture, but are systematically changed on to the clean veldt."

A method of testing whether worms are present in large numbers is given by the American scientist, Ransom, whom Dr. Theiler quotes: "We have been able to confirm the views expressed by Ransom that the mature young worms are able to crawl and to ascend perpendicular

surfaces, provided the atmosphere is saturated with moisture, which, of course, is frequently the case in a rainy season. Blades of grass, at the roots of which such young worms are placed, were found swarming with worms after remaining a few days in a saturated atmosphere under a glass bell. The young worms may also be seen with the naked eye crawling up the inner surface of a test tube, when some droppings containing eggs are placed in it. This is a convenient way of finding out whether a sheep is infected with worms, and to what degree this infection exists. The manure is placed in a wine-glass, covered so as to ensure a moist atmosphere in the glass, and within a few days white masses will appear along the walls of the glass. These masses consist of young wire-worms."

Dr. Theiler is a strong advocate of periodical burning. He says—

"One (of the methods) is the burning of grass. It has been stated above that the young worms crawl to the top of the grasses, from where they reach the stomach of their host. The South African farmers know the value of a 'brand' although they have not made a full use of that knowledge.

"Where no clean ground and no fresh brand is available, and sheep after dosing become reinfected, the repeated use of vermicides is the last resource. These vermicides reduce the numbers of worms in the stomach, and, although this treatment is the least satisfactory, it is nevertheless made the most use of. It ought to be supplemented by 'rotation of pasture' system, as indicated before, when the necessity of frequent dosing is reduced."

THE MEDICINES.

" A number of experiments were undertaken by us to test the two common medicines used for dosing sheep—*i.e.*, bluestone and Cooper's dip. The former was first recommended by the late Dr. Hutcheon in liquid form, but as the drenching of sheep was followed frequently by accidents due to traumatic pneumonia, many farmers considered it too dangerous to be recommended. Cooper's dip, for a long time, has had the reputation of being a good remedy for wire-worms, although the safe dose which could be given to the various classes of sheep has never been worked out properly. Since a combination of the two had already been adopted by many farmers, and which was highly recommended, it was thought advisable to give it our attention and to ascertain, in a series of experiments, the safe maximal dose."

"The results of these experiments were published in the 'Union Agricultural Journal' for August, 1912, and may be shortly summarised here:—

"Maximal safe dose for sheep of 4-8 tooth, 15 grains Cooper's dip and 15 grains bluestone; maximal safe dose for sheep 2-tooth, 10 grains Cooper's dip and 10 grains bluestone; maximal safe dose for lambs from five months, 7½ grains Cooper's dip and 7½ grains bluestone. Experiments proved that smaller doses than the maximal safe dose were equally effective; and accordingly the doses recommended were as follow:— Sheep of 4-8 tooth, 10 grains Cooper's dip and 10 grains bluestone; sheep 2-tooth, 7 grains Cooper's dip and 7 grains bluestone; lambs, 6 to 9 months old, 5 grains Cooper's dip and 5 grains of bluestone. The effect of dosing with a mixture of Cooper's dip and bluestone was controlled in the experiments by counting the eggs passed by the sheep

before and after dosing; if the drug is effective it must kill off all the wire-worms and no more eggs will be produced."

Here follow tables, to which I must refer the reader. The net results appear to be:—

"The decisive effect of this experiment—(No. 1 Table) 15 grains Cooper's dip and 15 grains bluestone—on sheep is shown, but at the same time it can be seen that not all the worms were killed by even this maximal dose. No. 2 Table: 7½ grains Cooper's dip and 7½ grains bluestone. This table shows a decisive effect on the worms, but nevertheless eggs were still found in some of the dosed sheep on the seventh and tenth days."

"It may be stated here that we cannot expect to find a medicine which, given only once, would prevent a reinfection for any length of time. The effect of any drug will wear off, and this takes place after a comparatively short time. Accordingly, if the animals cannot be removed out of the infected pasture, recourse is taken to repeated dosing, and it is important to know at what intervals and how frequently this dosing can be undertaken without injury to the sheep. To settle these points further experiments were made, and the results appear below."

The tables are given, but for reasons of space must be omitted. The conclusions reached, however, are interesting. They are as follow:—

"The three control sheep which were not dosed gained, during the experiments, 3 lb. in weight; the examination of the droppings in the course of the experiments showed that they lost the worms without any treatment."

[TO BE CONTINUED.]

PREVENTION OF FOOTROT IN SHEEP.

In reply to an inquiry as to the best means of preventing footrot in sheep in a wet climate such as the Cairns district, Mr. W. G. Brown, Instructor in Sheep and Wool, advises:—

The first necessity in wet seasons or on soft ground in the treatment of sheep is a stony ridge or sandy ground to which they may retire from the wet conditions of flats. In the absence of such there will always be trouble with the animal's feet. It is also necessary that the feet be inspected periodically and trimmed. A pair of clippers, such as are used by orchardists for trimming fruit trees (secateurs) is suitable for the work. Sheep on hard or sandy country do not suffer from long hoofs, because the feet are worn as fast as they grow. After trimming the feet, the bluestone treatment is the best I know of, and is used as follows:—

A race is made about 12 ft. long and about 1 ft. 9 in. wide. The floor of this race is made into a shallow trench, about 3 in. deep, and then filled with a solution of bluestone in the proportion of 1½ lb. of bluestone to 4 gallons of water. The sheep are then driven through. To prevent the sheep carrying a sore foot, as they are apt to do, stones should be placed in the trough, so that the animals stumble, and place all four feet down in the solution. When trimming the feet, examine the gland between the toes, and see that it is not blocked up with grass seeds or mud. This blocking is often a cause of lameness, and so-called footrot. The real footrot is contagious and infectious, and does not, as far as I know, exist in Queensland.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF JUNE, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Noble Dot ...	Jersey	2 May, 1915	630	4·6	34·14	In addition to grazing on natural pastures, the cows received a daily ration of ensilage.
Iron Plate ...	,, ...	21 Feb. ,,	443	5·4	28·31	
Lady Athol	Shorthorn... ...	29 May ,,	748	3·2	27·91	
Netherton Belle	Ayrshire	23 April ,,	564	4·2	27·83	
Lady Twylish	Jersey	5 June ,,	496	4·7	27·47	
Lady May ...	Ayrshire	7 Mar. ,,	605	3·6	25·51	
Cocoatina ...	Jersey	6 Mar. ,,	377	4·9	21·78	
Madame Melba	Holstein	8 Sept., 1914	498	3·4	19·78	
Thornton Fairetta	Jersey	27 Mar., 1915	344	4·7	19·05	
Nellie II. ...	Shorthorn... ...	20 July, 1914	463	3·5	18·95	
Lady Melba	Holstein	6 Mar. ,,	430	3·7	18·64	
Miss Melba	,, ...	22 Nov. ,,	492	3·2	18·35	
Lady Loch II.	Ayrshire	8 Feb., 1915	318	4·8	17·99	
Nina ...	Shorthorn... ...	18 Feb. ,,	478	3·2	17·82	
Bella ...	Ayrshire	19 Jan. ,,	434	3·5	17·76	

ABERDEEN-ANGUS AS MILKERS.

BY P. R. GORDON.

Very little attention has been paid to the milking properties of the Aberdeen-Angus in Australia, and it is not very widely known in the Commonwealth that two of the breed won the championship at the London Dairy Show in 1892 and at the Dublin Dairy show in 1904, in addition to many subsidiary honours at these exhibitions. In the middle of last century the Aberdeen-Angus cattle were noted for their great milking properties throughout a great part of Scotland. Their chief claim lay in the richness of their milk. Youatt mentions that the polled cows of Buchan, small as they were, gave from 12 to 16 quarts, and sometimes even as much as 28 quarts. Several tribes are excellent milkers even to the present day—the most notable of which is the Fyvie Flower, and any of the strain, whether in pure or crossbred form, are eagerly purchased by the dairymen around Aberdeen. In fact their fame is equally great around Edinburgh, where the industry is practically one of cow feeding: That is, a cow enters the stall in full milk, and leaves it fat. The early breeders specialised to some extent in milking qualities—in fact, good milking properties were considered

absolutely necessary in the formation of the Keilor herd of Hugh Watson. A few years ago the Earl of Airlie, in a letter to the " North British Agriculturist," wrote: " I have at present seventeen pure Aberdeen-Angus cows in my dairy. The greater number of these give from 18 to 21 and sometimes 24 quarts a day for a considerable time after calving. The milk is admitted to be much richer than that of either the Shorthorn or the Ayrshire. As regards the length of time during which they will continue to give milk, my cow, Belle of Airlie (1959), as pure a polled animal as any in the herd book, used to be milked all the year round. Last year when I was from home, they left off milking her about a month before she calved and she died of milk fever, induced by the circumstance that she had not been relieved of her superabundant milk." At a later date he wrote: " When I wrote on the subject I had some cows that (newly calved) gave 21 quarts. I have now some cows that are giving as much as 18 quarts daily though quite three months calved." A friend of mine sent me some particulars of the Fyvie stud, where the milking reputation of the breed was well maintained until the dispersal of the stud. Charlotte of Fyvie was a marvellous type of a dual-purpose cow, and was equal to her 3½ lb. of butter per day, and her grand-daughter won the second prize at the great Smithfield beef show. Duchess of Fyvie was also a great butter cow, and found her way into the stud of the Earl of Southwick, who also purchased two of the heavy milkers at 88 and 89 guineas at the sale. A cow of more than passing interest to Australia, bred at Fyvie, was Mary Grace, said to have been " as sweet a cow as ever was looked upon. She was the mother of Knight of Fyvie that came to Australia and was owned by the late Mr. David Syme, of Melbourne. Some of his progeny turned out exceedingly good milkers, and from Mr. Syme's catalogue we read of some of them giving as high as 20 quarts per day, although three months calved. Lizzie of Fyvie was a fine milker and went to Mr. Argo, of Cairdseat, and Fifty of Fyvie, also a good producer, was purchased by Sir William Forbes, of Craigievar. Annie Laurie, of the Fyvie Flower tribe, turned out a topnotcher in the dairy of Mr. Fraser, of Skilmafilly, and also bred many prize-winning stock. There can be little doubt that the Fyvie Flower and Pride of Aberdeen strains were from the indigenous stock of the Fyvie district, in addition to having an ancestor in the bull Angus, who was by Old Jock and out of Old Favourite, both bred by Hugh Watson. This further intensifies the belief that the Angus " Doddies" were a branch of the Aberdeenshire Buchan " Hummlies" that flourished in Fyvie and Buchan in pre-historic ages. How the one strain kept up its dual-purpose characteristics, as it does to the present day, while others went exclusively to beef, is just a matter of cultivation. But one thing is certain, the most exclusive " Pride " bull could never

shake the milking properties of the Fyvie Flowers, as example the Knight of Fyvie, a first cross of the two strains. The late Mr. James Smith, of Burnshangie, one of the oldest breeders of Aberdeen-Angus, wrote in regard to the old Buchan cows:—" The nearest approach to the best types of old Buchan cows that I can recollect is old Charlotte of Fyvie and Mr. Auld's 270-guinea cow, Pride of Aberdeen 9th." Now that dairying is assuming important dimensions in Scotland, and more especially in Aberdeenshire, it is not surprising to note that one of the first factories established in the country was at Fyvie. This shows the great local influence of the early labours of the breeders that is still being felt, although most of them have found a resting place in the green kirkyard on the banks of the Ythan, celebrated for its trout and pearls. The Aberdeen-Angus have much to commend them to Australia, as it is very doubtful if there is a breed of cattle on earth that serves a better dual purpose. The days of slaughter of the dairy calves are past, and beef will be beef for many years, and it is doubtful if a better all-round farmers' cow—a frugal, easily kept, rich butter cow—can be obtained than by crossing the Aberdeen-Angus on the Jersey, Shorthorn, or Ayrshire breed. We are verging into new circumstances, and these circumstances are similar to those of the dairymen around Glasgow, where the Aberdeen-Angus bull is extensively employed in Ayrshire dairy herds. The farmers are getting good male calves that fetch good prices—in fact, one year an Aberdeen-Angus-Ayrshire took second prize in the crossbred section of the Smithfield Show. And, from the prices that are being paid for the females of the composite dairy strain, it cannot even be hinted at that they are losing their milking qualities.

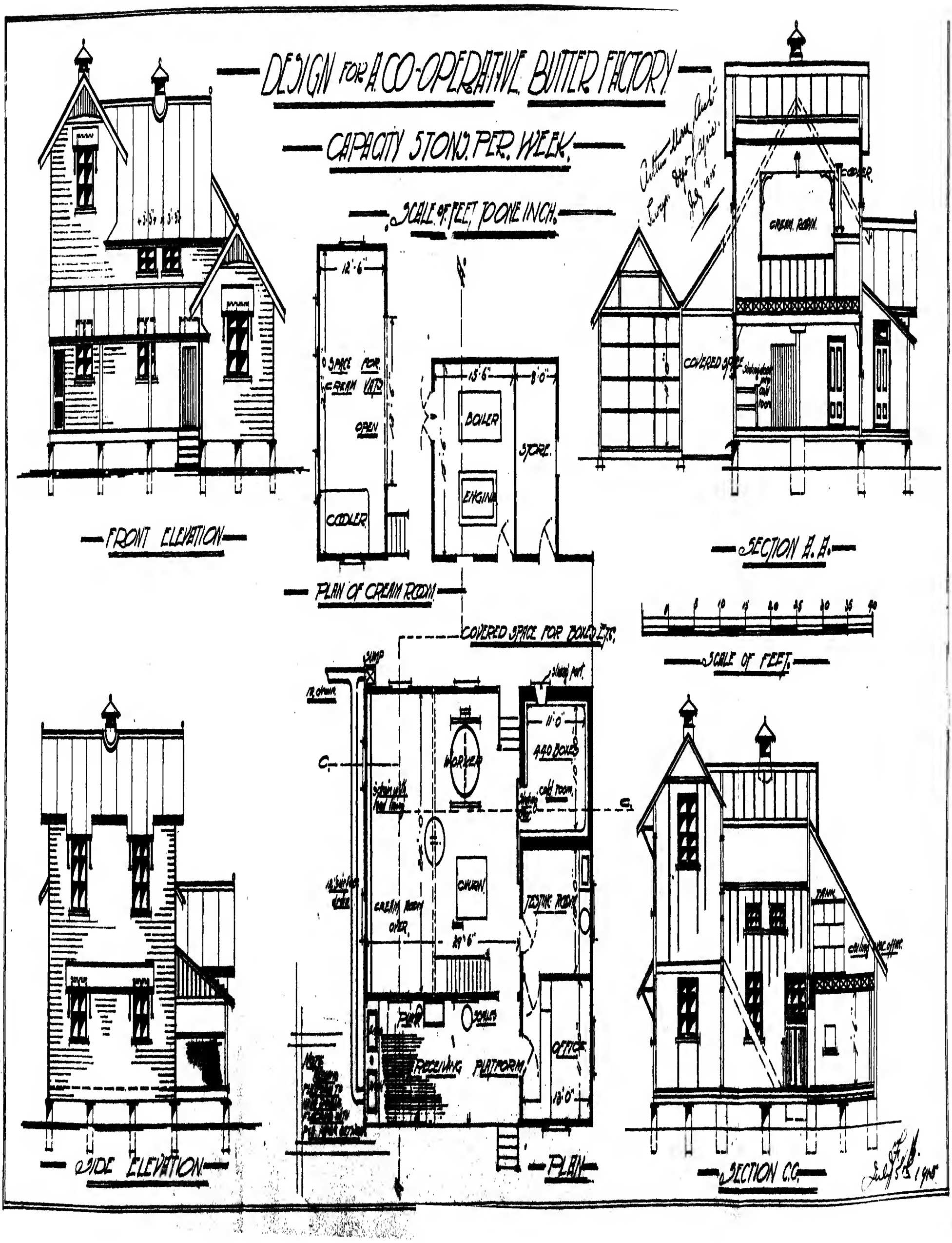
FEEDING DAIRY COWS.

Dairy cows should be fed immediately after milking, particularly if the fodder should be of a character likely to convey any taint to the milk.

Relative to the mixing of molasses with green fodder, it is difficult to decide the influence molasses will have when mixed with the fodder unless the nature of the fodder is stated. However, it is to be said that molasses is generally used for the purpose of making the dryer fodders more appetising for the dairy cows, and, when used in this way, it is found that the dry fodders are more readily consumed by the animals.

DESIGN FOR A CO-OPERATIVE BUTTER FACTORY.

In response to inquiries we have from time to time received, as to the most up-to-date butter factory buildings, Mr. A. Morry, surveyor, Department of Agriculture and Stock, has prepared the accompanying plans for a modern factory, having a capacity of an output of 5 tons weekly. These plans so clearly show the whole scheme, that any additional explanation is superfluous.


DESIGN FOR A CO-OPERATIVE BUTTER FACTORY
CAPACITY 5 TONS PER WEEK
SCALE OF FEET TO ONE INCH
FRONT ELEVATION
PLAN OF CREAM ROOM
12' 6"
SPACE FOR CREAM VATS
OPEN
COOLER
13' 6"
8' 0"
BOILER
ENGINE
STORE
SECTION A.A.
CREAM ROOM
COVERED SPACE
SCALE OF FEET
0 5 10 15 20 25 30 35 40
COVERED SPACE FOR BOXES ETC.
WORKER
11' 0"
440 BOXES
cold room
CHURN
CREAM ROOM
OPEN
20' 6"
TESTING ROOM
RECEIVING PLATFORM
OFFICE
13' 0"
SIDE ELEVATION
PLAN
SECTION C.C.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JUNE, 1915.

Five thousand one hundred and forty-seven eggs were laid during the month. Three of Mr. J. M. Manson's White Leghorns are now in moult. Since last report the pens owned by Messrs. C. E. Bertelsmeier and A. H. Padman have had a slight attack of warts, which has greatly affected their laying, especially in the case of the latter, two of whose birds appear to be breaking into moult. The weather has been very changeable—a few days very warm, followed by cold westerly winds lasting in one instance for ten days. This was very trying for the birds. R. Burns wins the monthly prize with 145 eggs. The following are the individual records:—

Competitors.	Breed.	June.	Total.
Mrs. J. Jobling, N.S.W.	Black Orpingtons	119	370
Jas. McKay	White Leghorns	132	363
Mrs. Munro	Do.	131	323
J. D. Nicholson, N.S.W.	Do.	110	318
C. B. Bertelsmaier, S.A.	Do.	93	310
J. Gosley	Do.	115	308
A. W. Bailey	Do.	110	296
A. H. Padman, S.A.	Do.	81	295
S. E. Sharpe	Do.	87	295
J. R. Wilson	Do.	108	293
King and Watson, N.S.W.	Do.	126	287
Kelvin Poultry Farm	Do.	123	280
E. F. Dennis	Do.	121	277
C. F. Clark	Do.	116	276
A. T. Coomber	Do.	102	273
J. M. Manson	Black Orpingtons	112	272
T. Fanning	White Leghorns	84	268
E. V. Bennett, S.A.	Do.	110	264
R. Jobling, N.S.W.	S. L. Wyandottes	104	260
C. Knoblauch	White Leghorns	95	258
H. Harnill, N.S.W.	Do.	99	253
O.K. Poultry Yards	Do.	92	252
J. M. Manson	Do.	86	248
R. Jobling, N.S.W.	Do.	103	248
E. Le Breton	Do.	123	242
F. Clayton, N.S.W.	Do.	94	239
Cowan Bros., N.S.W.	Do.	100	237
R. Burns	Black Orpingtons	145	231
J. Aitcheson	White Leghorns	123	231
Geo. Tomlinson	Do.	129	230
W. Meneely	Black Orpingtons	118	229
T. Fanning	Do.	119	227
W. Lyell	White Leghorns	86	219
Moritz Bros., S.A.	Do.	98	217
E. A. Smith	Do.	84	214
W. Parker	Do.	80	211
Derrylin Poultry Farm	Do.	84	211
W. Purvis, S.A.	Do.	79	211

Competitors.	Breed.	June.	Total.
R. Burns	S. L. Wyandottes ...	113	204
J. Zahl	White Leghorns (No. 2)	71	198
Cowan Bros., N.S.W.	Black Orpingtons ...	93	194
G. H. Turner	White Leghorns ...	93	186
W. Lindus, N.S.W.	Do.	103	174
J. Zahl	Do. (No. 1)	75	166
J. G. Richter	Do.	104	160
Loloma Poultry Farm, N.S.W. ...	Rhode Island Reds ...	80	153
E. Pocock	White Leghorns ...	64	147
J. H. Gill, Victoria	Do.	63	144
E. A. Smith	Black Orpingtons ...	92	132
S. Chapman	Brown Leghorns ...	86	110
W. H. Forsyth, N.S.W.	White Leghorns ...	27	65
F. Clayton, N.S.W.	Rhode Island Reds ...	62	63
J. R. Johnston	Plymouth Rocks ...	0	0
Totals	...	5,147	12,132

FEEDING OF POULTRY.

Mr. Hindes, Poultry Expert at the Queensland Agricultural College, replying to a question on the above subject, says: "With reference to the quantities of food given to fowls, as I pointed out in the report on the egg-laying competition, it is impossible to lay down any hard-and-fast rule. The feeder must find out for himself the amount of food the birds require at any one time, as they eat far more when laying heavily than they do when not laying, or when any portion of the flock is laying. To make it, if possible, plainer, we will suppose that a fowl requires, say, 3 oz. of food per day to keep it in good condition when not laying. The same hen commences to lay, say, four eggs a week, each egg weighing 2 oz. That means that the hen is producing 8 oz. of eggs per week, or over 1 oz. per day. She will, therefore, require over 1 oz. more food per day than when not laying. We feed the same all the year round, but in varying quantities according to the way the birds are laying.

WORMS IN FOWLS.

The adult worms (*Heterakis*) are generally found in the alimentary canal of the fowl, but sometimes occur in the intestines. They develop direct from the eggs, which are eaten by the fowls (Theobald). If present in large numbers they may cause death. The birds should be kept without food for twenty hours, when the following dose should be given:—One grain of santonine and 7 grains of freshly-grown areca nut. Miss two or three days, and then repeat dose. This should complete the cure.

The Horse.

TREATMENT OF STRANGLES IN HORSES.

Horses affected by strangles should be kept dry and away from draughts. They should be rugged at night. Any swelling that appears should be well rubbed with the following embrocation:—Strong ammonia, 1 oz.; turpentine, 1 oz.; water, 2 oz.; olive oil, 6 oz. A plentiful supply of cold water should be allowed, into which 2 dr. chlorate of potash and 2 dr. nitrate of potash should be put, morning and night. Soft, nourishing food should be given, and it is advisable to place this on the ground, so as to favour any discharge from the head. If a discharge makes its appearance, the head should be steamed with hot bran for an hour twice daily.

FOAL OUT OF CONDITION.

A nineteen months old foal, which, after being weaned, falls off in condition, but is otherwise in good health, should not be purged or bled. The best treatment to regulate the bowels and also to put condition on to the animal is to give it linseed jelly, which is made up as follows:—One teacupful of linseed should be placed in a billycan and just covered with warm water. This should be allowed to boil over a slow fire until the seeds have burst. One-half of the jelly should be mixed in a bran mash.

REMOVING LAMPAS FROM HORSES.

The palate should be lanced between the first and second bars. Upon no account should the knife be inserted beyond the second bar, as there is a large artery there, which, if cut, will give a great deal of trouble before bleeding is stopped.

CANARY SEED.

A heavy crop of canary grass will often yield over 3 tons of hay. The best month for sowing the seed is May, but it is possible to secure a catch crop by sowing as late as June, or even July; 15 lb. of seed will suffice per acre if drilled in. As for soil, excellent crops have been raised on the heavy brown, loamy soil at the Hermitage State Farm. The young crop may be grazed off by sheep provided they are not kept on it too long, particularly when late in the season.

State Farms.

NOTES FROM KAMERUNGA STATE NURSERY, CAIRNS, NORTH QUEENSLAND.

Mr. C. E. Wood, manager, reports as follows for the month of June:—

Rainfall for month, 1·99 in.; number of days on which rain fell, 9; rainfall from 1st January to 30th June, 19·84 in.; average rainfall for the same period, 1st January to 30th June, for the previous twenty-five years, 72 in. These figures will give some idea as to the dry conditions prevailing in this Northern district. I might also mention that the smallest rainfall for the above period during the twenty-five years was 38·12 in. in 1897 and 38·55 in. in 1902—practically double the rainfall so far experienced this year. Maximum temperature, 89; minimum temperature, 49. From the above figures it will easily be understood that many of our tropical crops, requiring as they do a good amount of rain, are either a complete or partial failure.

The effect on coffee, as noted here, has not been in reducing the number of cherries, as the setting of the fruit took place during October and November of last year, when conditions were favourable; but the fruit has undoubtedly ripened earlier, and the beans are small.

In bananas the effect has been not so much in reducing the number of hands, as bunches maturing now would have already been formed before they could be affected by the dry weather; but, excepting in very small bunches, the individual fruits or fingers have failed to swell to what would be their normal size, also the hands are closer together, thus giving the bunches a small and dumpy appearance as compared to what they would be under normal weather conditions.

LIVING IN TENTS.

Horticulture.

INCREASING ORNAMENTAL-LEAVED BEGONIAS.

Were the ornamental-leaved begonias more difficult of cultivation, probably they would receive greater attention and be more appreciated. The ease with which they may be cultivated, and the remarkable colourings of their large leaves, entitles them to greater prominence than both amateurs and professionals allot to them at present in South Africa. The markings of their leaves are unique in shape, and wonderful for the large range of colours even a single leaf may contain. All shades from the deepest velvety black crimson to the purest silver white are to be found; and nothing relieves the green of a fernhouse or stoep with more harmonious effect.

Perhaps one reason that they are not popular is that the "man in the street" does not understand how to create young plants to follow his old ones when they naturally, during the course of time, become untidy. With the object of showing how simple their reproduction really is, we are featuring this process in our Pictorial Hints this month. First of all let us state that this class of begonia must be grown in partial shade, exposure to direct sunshine having an unfavourable effect upon the foliage.

The plants are suitable for either borders, pot culture, or growing on rockwork, an open soil composed of 8 parts fibrous loam, 4 parts peat, 4 parts leaf-soil, 2 parts thoroughly decayed manure, and 1 part coarse sand being satisfactory. During the winter the roots of the

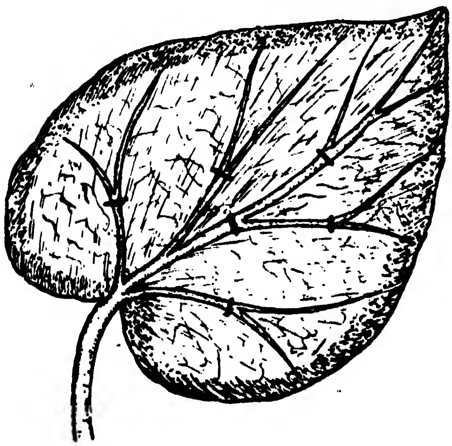


FIG. 1.

The underside of a Begonia leaf, the cross lines showing the proper positions in which to cut the notches in the principal veins before laying the leaf on the soil.

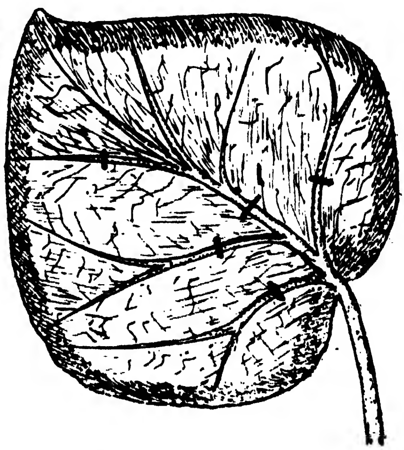


FIG. 2.

Another leaf of Begonia with the notches cut in the wrong positions, these being too far from the oints from which the secondary ribs branch out.

plants should be kept on the dry side; but during the growing period plenty of water at the roots is essential, together with occasional applications of well diluted liquid manure.

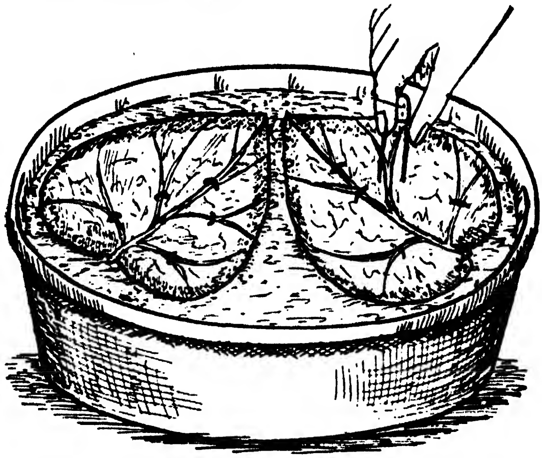


FIG. 3.

Two Begonia leaves cut as in Fig. 1 placed upon the pan of soil and held in close contact with the soil with small hairpins or layering pins.

PROPAGATION BY LAYERING.

Although ornamental-leaved begonias can be increased by division of the plants, the most interesting method of propagation is by layering the leaves. Well-developed, sound leaves must be selected for this purpose, and after being removed from the plants turned underside upwards, so that cuts or notches can be made in the principal veins. The notches should be cut about half way through the veins at points where secondary veins branch out. A number of notches may, of course, be made in each leaf. At each cut the sap in the ribs will form a callus and foundation for the production and development of roots. A well-drained shallow pan of light sandy soil should be prepared, and after watering and allowing the soil to drain, the surface should be covered with a layer of sand. The prepared leaves should then be laid on the surface cut side downwards, whilst the leaf stem should be inserted in the soil; and to ensure the notches in the ribs coming in contact with the soil, hairpins or wire layering pins should be passed through the leaves near these points. Plunge the pan in cocoa fibre refuse in a propagating frame having a temperature of from 60 degrees to 70 degrees, shade from the sun, keep nicely moist but not wet, and after a time, if all is satisfactory, a tiny plantlet will be produced at each notch made in the veins of the leaves. As soon as the plantlets are large enough to handle they should be lifted and planted singly into small pots. The best time to increase foliage begonias by division is when the plants are repotted in the spring.

VARIETIES.

Amongst the many varieties of ornamental-leaved begonias the following comprise some of the best:—Begonia Rex, deep green leaves of metallic hue, ornamented by a ring of silvery white; B. Louise Gloson,

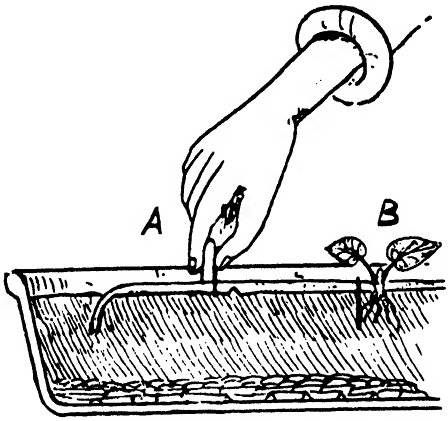
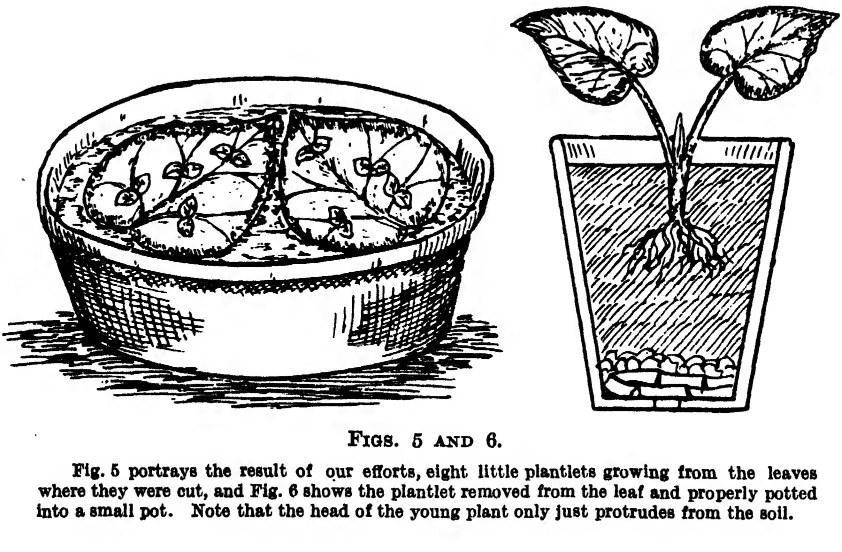


FIG. 4.

Shows the pan in section and the best position for pinning down the leaf, *i.e.*, over the rib a short distance from the notch. B shows the plantlet growing from the notch.

dark maroon foliage relieved by a crimson horse-shoe; B. Eudoxa, bronze leaves relieved by pink and white spots; B. Comtesse de Louise Erbody, silvery leaves margined with purple-lake and green veins; B. Prince



FIGS. 5 AND 6.

Fig. 5 portrays the result of our efforts, eight little plantlets growing from the leaves where they were cut, and Fig. 6 shows the plantlet removed from the leaf and properly potted into a small pot. Note that the head of the young plant only just protrudes from the soil.

Charles of Denmark, crimson leaves ornamented with a silvery horseshoe; and B. President Carnot, silvery white variegated leaves.—"South African Gardening and Agriculture."

MR. F. MANSON BAILEY, C.M.G.,

Late Colonial Botanist.

Last month it was learnt with profound regret that Mr. F. M. Bailey, Colonial Botanist, Queensland, had passed away at his residence at Kangaroo Point. The deceased scientist's illness was but a brief one, and only a few days prior to his death he was apparently in the best of health, and busied himself in his garden, despite the weight of his 88 years, up to the day of his death, when he became unwell and gradually lapsed into unconsciousness. He will be mourned by all, not alone for the loss which his death will inflict on the scientific world, though he leaves the nation a rich heritage in his compilations on botanical subjects, but because of his personal attributes.

The late Mr. Frederick Manson Bailey was lovable and kindly, and his life seemed to have been woven into the warp and woof of the fabric of Queensland. He leaves a gap that will be hard to fill. But his memory—the memory of a man who faithfully served his day and generation, and lived in charity with his neighbours—will be preserved green. Many a kindly remembrance of the old man will be called up from the galleries of the past. Frederick Manson Bailey first saw the light of day in London on 8th March, 1827. Hackney was the well-known old suburb in which his parents lived. His father, John Bailey, like his father before him, was a lover of nature, and studied it not merely for the sake of the living it yielded him, but because of an inherent love of plant life in its many forms. For many years in London the Bailey family conducted operations as nurserymen and seedsmen, and it was in the hope of making fresh conquests in the fields of botanic research, and of finding a larger and freer scope for his offspring, that John Bailey, in 1838, set sail for Australia with his family in the frigate "Buckinghamshire." She was the largest vessel that had ever sailed for the antipodes, her gross burthen being 1,500 tons. The vessel duly arrived in Southern waters, and on 22nd March, 1839, dropped anchor in Holdfast Bay, South Australia. John Bailey and his family set foot on the island continent full of hope as to the future. Colonel Gawler was then Governor of the Crown colony, and he nominated the new comer as Government Botanist. John Bailey accepted the position, and laid out the first botanical garden in the Southern capital. But times of stress came for South Australia, and Mr. Bailey resigned the position and established a nursery, Bailey's Gardens, as it was known, and the son Manson, now grown into manhood, took a hand in its management and control. But in the fifties there broke out the famous gold-rushes in Victoria, and young Manson Bailey, tempted by the fascinating lure of gold, threw up the garden spade to take up the miner's pick on Bendigo. Possibly he might have become a mining magnate had he not been recalled to Adelaide by the illness of his father. He resumed the old work for a time, but in 1858 resolved to go forth on a fresh quest. This time he made for New Zealand, where he took up land in the Hutt Valley, but was forced out of this fertile spot by the outbreak of the Maori war. So he set his feet towards Sydney, and after the briefest

acquaintance of New South Wales pushed on for Brisbane. He landed in the capital of Queensland in 1861, and established a seed business in a shop in Edward street, but there came a time of financial stress in the State, the shop was shut up, and the indomitable spirit of Frederick Manson Bailey had to look around for other avenues of living. Fate turned his steps in the direction of the position held by his father—that of Colonial Botanist. In 1875 a board was appointed by the Queensland Government to inquire into the causes of diseases affecting live stock and plants, and Mr. Bailey was appointed to deal with the botanical side of the problem. He took up the work with the enthusiasm and thoroughness typical of his nature, and pursuing his investigations far and wide throughout the State he contributed some valuable articles in regard to the native grasses of Queensland. He next was appointed to the charge of the botanical section of the Queensland Museum, and in 1881 was appointed to the proud position of Colonial Botanist of Queensland—a position he held and the duties of which he discharged with devotion and with benefit to the State up to the time of his death. During the years that followed his appointment as Colonial Botanist he travelled extensively throughout the State, and gained much valuable information regarding the flora of Queensland and its timber resources. The result of his researches was embodied in numerous volumes and papers, the most important of which is "The Flora of Queensland," an illustrated publication of seven volumes, dealing exhaustively with the vegetation of this fertile State. Mr. Bailey, who was recognised as a world's authority on botany, received the Clarke memorial medal, awarded by the Royal Society of New South Wales, in 1902, for researches in natural science, and fitting acknowledgment of his great services to Queensland came in 1911, when, his hair snow white with years, and his body bent by his labours, he was created C.M.G. by letters patent from the King. In reviewing a life so full of activity and so useful it may be pointed out that while paying attention to the systematic description of plants and their nomenclature he laid very great stress on their economic uses, and during the term of his official career he demonstrated the great value of native grasses, and emphasised the value of the timber resources of the State. He was a trained horticulturist, and his advice as a practical gardener, as well as a scientist, was always eagerly sought. He wrote interestingly regarding the garden plants and naturalised weeds. Another feature of his work was that he always kept his knowledge of the plant life of Queensland up to date. At one time he was indefatigable in travel in order to prosecute his research work, and in comparatively recent years he undertook a Northern tour and ascended the Bellenden Ker Range. In the official report dealing with the expedition he gave a full account of the plants of that region. He also studied plant life closely in the aspect of its medicinal value, and investigated the uses made of plants by the aborigines as food and for other purposes. As a scientific botanist he ranked high, and his information was always sought by botanists, Australian or foreign. He was not only in constant communication with the workers in this science, but prided himself on being a disciple of them—especially of the late George Bentham, the author

of the great work on Australian plants, "Flora Australiensis." Among his friends he numbered also Baron F. von Mueller, late Government Botanist of Victoria. As a worker he was tireless, and for years, after his official hours, was to be found at his desk in his own home pursuing the study of Australian plants. An illustration of his absorption in his work is found when, in the nineties, a period of retrenchment was ushered in, and Mr. Bailey's position as Colonial Botanist was abolished. Despite that fact he continued to attend his office and discharge his duties cheerfully, stating that the work must proceed whether he was paid for it or not; and there was such a protest from the public, who recognised the valuable work he was doing, that he was soon reinstated in his position with honour. By his sympathetic and genial disposition he made very close and intimate friends, and his character was such that whenever he made a friend he maintained that friendship throughout life. He had a fine memory and a splendid fund of anecdotes, his reminiscences of early life in South Australia being most interesting. He was very fond of flowers, of children, and of poetry, and his conversation was freely besprinkled with quotations from such authors as Pope, Gay, and Goldsmith. To the last he retained most of his faculties almost unimpaired, and was a fine example of an old English gentleman.

Of his writings the earliest, probably, was his "Handbook to the Ferns of Queensland," published in 1874; and among his numerous other publications were—"Synopsis of the Queensland Flora" (with three supplements), "Fern World of Australia," "Lithograms of Queensland Ferns," "Companion for Queensland Students of Plant Life," "Botany Abridged," "Notes for Guidance of Amateur Fruit Growers," "Catalogues of Plants in Brisbane Gardens," "Museum of Economic Botany," "Queensland Plants," "Queensland Woods," "Queensland Grasses," "A Sketch of the Economic Plants of Queensland," thirteen Botany Bulletins, and (in conjunction with Mr. P. R. Gordon, then Chief Inspector of Stock) "Plants Reputed Poisonous and Injurious to Stock." He also contributed monthly illustrated articles to the "Queensland Agricultural Journal," under the title of "Contributions to the Flora of Queensland and New Guinea." . . . He was a Fellow of the Linnaean Society. In 1856 he was married at Adelaide to Anna Maria, eldest daughter of the Rev. Thomas Waite, M.A., and his only son is Mr. John F. Bailey, the popular Director of the Botanic Gardens, who has inherited his father's taste for arboriculture.

We have taken the above notice of the late Mr. Bailey's life and work from the "Brisbane Courier." We may add that Mr. J. F. Bailey has now been appointed to succeed him as Colonial Botanist—a position he is in every way qualified to fill. His grandson, Mr. C. White, is also well advanced in botanical work, and as time goes on will doubtless follow in his footsteps.

Chemistry.

ANALYSES OF FERTILISERS.

BY J. C. BRÜNNICH, Agricultural Chemist.

Since the introduction of "*The Fertilisers Act of* 1905" it has been found that in several instances difficulties arose in the administration of the Act and its regulations, and for this reason the Act was repealed and replaced by "*The Fertilisers Act of* 1914," which came into operation on the 1st day of January, 1915.

Samples of artificial fertilisers were again collected by the inspectors under the Act, but on account of the extreme shortage of potash fertilisers the stocks of mixed fertilisers are very low, and only a comparatively small amount of fertilisers could be obtained, the **analyses** of which are given in this report.

In accordance with the Act all **dealers,** which includes all persons who manufacture, import, indent, sell, deliver, forward, or deal in fertilisers, have to be **licensed,** and have to **register** the fertilisers they deal in. During this year sixty dealers have been licensed, and a complete list of these dealers and registered fertilisers will be given in a future issue of this Journal.

Upon the sale of any fertiliser the dealer must supply the buyer with an **invoice certificate,** signed by the dealer or his agent, stating the full name and place of business of the dealer; the name, trade mark, brand, or sign used to identify such fertiliser; quantity of fertiliser or net weight; the composition of fertiliser, setting forth the respective amounts of nitrogen, phosphoric acid, and potash, and the respective form in which they occur.

To each bag or package of fertiliser must be attached a **label,** certifying to the number of net pounds of fertiliser in the package, the figure, trade mark, or other sign under which fertiliser is sold, and the chemical analysis stating the proportion per centum of nitrogen, phosphoric acid, and potash, and the form in which they occur.

A slight variation in the composition of fertilisers, from the registered standard, is allowed under the Act and the **deficiency** of the amounts of nitrogen or potash must not be more than 5 per cent. or 1/20 of the total amounts of nitrogen or potash certified to be present, and in the case of phosphoric acid, 7 per cent. of the total amount of phosphoric acid.

The samples analysed agree fairly well with the registered composition, with the exception of one sample of imported superphosphate, which is much below standard.

The Act provides for the statement of the fertilising ingredients in per centum amounts of **nitrogen** (N), **potash** (K_2O), and **phosphoric acid** (P_2O_5), thus avoiding the confusion of terms previously used, like: Bone phosphate, ammonia, ammonium sulphate, potassium sulphate, &c.

Phosphoric acid appears under four different headings—**water soluble, citrate soluble, citrate insoluble,** and **total phosphoric acid.**

In bones, and in most of the mineral or rock phosphates, the phosphoric acid exists in combination with lime, in the form of a calcium phosphate—**tricalcic phosphate,** which is insoluble in water, partly soluble in citric acid solution (particularly bone phosphate), and easily soluble in mineral acids. On account of the insolubility the action of bone and mineral phosphates is very slow, and may extend over years. The finer the bones or phosphates are crushed or powdered the quicker will be the action, and for this reason the **fineness** of the bone-meals is of importance, and has to be stated.

When strong sulphuric acid is allowed to act on tricalcic phosphate (bone phosphate), part of the lime combined with the phosphoric acid is split off, lime sulphate or gypsum being formed and the phosphoric acid is left in form of **mono calcium phosphate,** the important ingredient of **superphosphates,** which is readily soluble in water, and therefore immediately available to plant life. In superphosphates, more particularly such made from mineral phosphates, a change of the water soluble form of phosphoric acid into a less soluble form, called reduced or reverted phosphate, takes place after storing. The same would happen if superphosphates are mixed with lime or ashes, and also when applied to soils containing large amounts of lime, and a **dicalcium phosphate** is formed which is insoluble in water, but soluble in citric acid solution. Another form of lime phosphate is found in basic slag or Thomas phosphate, a **tetra calcium phosphate,** which is also insoluble in water, but soluble in saline solutions, particularly such which contain salts of citric acid. These last two compounds are, therefore, classed as citrate soluble phosphoric acid, which is fairly readily absorbed by plant roots, and comes close in its value to the water soluble phosphoric acid.

Thomas phosphates must be ground as fine as possible, and a good sample should nearly all pass through a sieve having 100 meshes to a linear inch.

Nitrogen is the most expensive of all fertilising ingredients of a manure, and is chiefly supplied in form of **nitrate nitrogen,** as in Chili saltpetre and in nitrate of lime, or in form of **ammonia salts,** as in ammonium sulphate, a by-product of gasworks, or in form of **organic nitrogen** as in blood, green bones, meatworks manure, &c. Nitrogen in the form of nitrate is in quick acting and readily available form, but nitrates are not retained or absorbed by the soil, and therefore liable to be washed away by heavy rains. Nitrogen in form of ammonia salts and organic nitrogen is not so readily available, as it has to be changed first into nitrates by the process of nitrification going on in the soil. Favourable conditions and lime salts are necessary

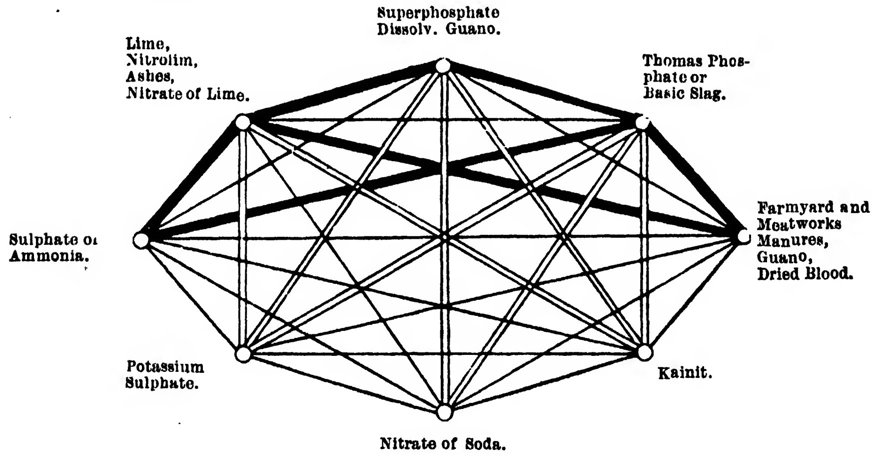
for this process, and in soils deficient in lime such manures may give poor or no results. Ammonium salts are retained and absorbed by the soil, and loss in the drainage water are not to be feared as is the case with nitrates. **Nitrolium** or **Cyananide,** an artificial fertiliser, actually produced from the nitrogen in the air, contains nitrogen in a form nearly as available as nitrate nitrogen.

Potash is generally used in the form of potassium sulphate, which at the present time cannot be obtained, as the only potash mines of commercial importance, worked so far, exist in Germany.

Attention is drawn to the analysis of ashes of various trees and plants, published at the end of fertiliser list, some of which contain fair amounts of potash, and may be utilised during the present shortage of potash fertilisers.

It is quite impossible to fix at the present day a monetary **manurial value per ton,** and therefore the usual unit values are omitted.

When **mixing fertilisers** together, such mixtures must be avoided which would lead to decomposition, which, for instance, would take place if ammonium sulphate was mixed with lime or with Thomas phosphates, superphosphate with lime; or which may cause caking, like mixing kainite with Thomas phosphate. A very simple guide for the mixing of manures is given in the accompanying diagram, devised by Dr. Geekens, which I slightly modified, however, to apply to our local conditions.



Manures joined by a *heavy black line* should *never be mixed* together; those connected by a *double line* must only be *mixed immediately before use;* and those joined by a *thin single line* may be safely *mixed* together *at any time.*

Any farmer in doubt about the quality of fertiliser purchased should at once apply to the nearest inspector under the Act, in order to let him draw a sample and submit same for analysis. All inspectors appointed under "*The Diseases in Stock Act,* 1896 *to* 1898," "*The Diseases in Plants Act of* 1896," or "*The Dairy Produce Acts,* 1904-1911," are officers under the Fertilisers Act.

ANALYSES OF FERTILISERS.

Lab. No.	Fertiliser.	Where Obtained.	Nitrogen N.	Phosphoric Acid. Water Soluble.	Phosphoric Acid. Citrate Soluble.	Phosphoric Acid. Total.	Potash, K_2O.	Lime, CaO.	Per Cent. of Crude Ash in Wood or Plant.	Remarks.
			%	%	%	%	%	%	%	
	Superphosphates.									
1412	Shirley's ...	Corser and Co. ...	...	16·10	...	...	...	...	...	
1584	Mount Lyell	Dalgety and Co., Brisbane	...	18·48	...	...	...	...	...	
1583	Shirley's ...	Paul and Gray ditto	...	16·98	...	...	...	...	...	
1582	Mount Lyell No. 1	Charles Taylor ditto	...	19·05	...	..	...	...	...	
1580	Hassell's ...	Webster and Co. ditto	...	13·72	...	...	...	...	...	Under standard.
1605	Hassell's (2nd sample) ...	Ditto ditto	...	11·83	...	...	...	...	...	" "
1581	L. Gross and Sons	Ditto ditto	...	17·43	...	...	...	...	...	
	Bone, Meatworks Manure.									
1586	Fertiliser ...	Baynes Bros.	4·98	...	...	18·40	...	...	...	
1409	Bone Dust	H. Baxter ...	3·55	...	...	22·93	...	...	...	
1576	Bone Dust, "Runcorn"	Dalgety and Co. ...	3·70	...	...	23·55	...	...	...	
1432	Bone Dust	J. W. Pohlman ...	3·61	...	...	27·62	...	...	...	
1350	Bonemeal, "Wattle Brand"...	Walsh and Co. ...	3·22	...	...	26·40	...	...	...	
1577	Bonemeal ...	T. H. Wood	4·14	...	...	23·40	...	...	...	
	Mixed Fertilisers.									
1411	Shirley's No. 3	Corser and Co. ...	3·42	14·21	...	...	1·93	...	...	
1413	Ditto No. 5	Ditto	3·27	12·20	...	...	5·53	...	...	
1414	Ditto No 9	Ditto	3·85	5·38	...	5·49	3·77	...	...	
1415	Ditto No. 11	Ditto	...	9·85	...	10·40	7·91	...	...	
1410	Ditto No. 777	Ditto	7·20	6·52	...	6·85	6·70	...	...	
1590	Ditto No. OR	Paul and Gray, Brisbane	2·24	...	8·60	17·19	6·36	...	...	
1592	Ditto No. 3	Ditto ditto	3·55	12·40	...	12·90	1·79	...	...	
1591	Ditto No. 14	Ditto ditto	2·41	5·01	...	16·45	5·93	...	...	
1589	Ditto No. 3	Charles Taylor, Brisbane	3·68	11·88	...	...	2·06	...	...	
1588	Ditto No. 5	Ditto ditto	3·32	11·90	...	...	5·67	...	...	
1351	Ditto No. 9	Walsh and Co. ...	4·09	4·89	...	5·35	3·95	...	...	

Simple Fertilisers.

1492	Sulphate of Ammonia	Brisbane Gas Company	20·98	...	...	...	...	...	...		
1585	Nitrolim	Trackson Bros., Brisbane	19·12	...	...	...	...	...	...		
1587	Sulphate of Potash	Webster and Co. ditto	...	...	...	...	52·50	...	...		

Wood and Plant Ashes.

Red Gum	...	...	...	...	·38	4·17	...	...	
Spotted Gum	...	...	...	...	·10	·70	...	...	
Bloodwood	...	...	...	...	·27	5·25	8·47	...	
Ironbark	...	...	...	...	·82	1·53	...	...	
Blackbutt	...	...	...	...	·04	2·02	7·27	...	
Boxwood	...	...	...	...	·87	1·85	...	...	
Belar	...	...	...	...	·02	4·95	49·10	...	
Gidyea	...	...	...	...	·90	1·10	48·70	...	
Brigalow	...	...	...	...	...	·89	54·40	...	
Bottle Tree	...	...	...	...	·24	29·02	23·48	...	
Apple Tree	...	...	...	...	·34	4·45	29·85	...	
Cedar	Works Department	...	...	...	·71	·71	48·50	1·00	
Pine	Ditto	...	...	...	·89	9·97	38 05	·82	
Oregon Pine	Ditto	...	...	...	·50	1 31	29·12	·77	
Hardwood	Ditto	...	...	...	·60	1·90	29·33	·31	
Nettlewood	G. Matthews, Crow's Nest	...	...	...	4·14	6·46	28·05	3·36	
Blue Mangrove	A. F. Cutlock, Sandgate	...	...	...	2·52	2·14	16·72	...	
Black Mangrove	E. Rauge, Cairns	...	...	...	·56	1·34	35·88	...	
Mangrove (*Ceriops candoleana*)	Ditto ditto	...	...	...	·76	3·28	36·80	...	
Mangrove, twigs and leaves	A. F. Cutlock, Sandgate	...	...	...	2·12	4·42	12·30	...	
Stinking Roger	G. Matthews, Crows Nest	...	...	...	15·81	20·00	27·18	2·62	
Lantana	...	...	...	...	3·57	13·96	16·95	...	
Lantana, twigs and leaves	A. J. Cutlock, Sandgate	...	...	...	3·50	11·78	11·52	...	
Banana plant	...	...	...	...	1·48	36·64	21·32	...	
Sisal Hemp	...	...	...	...	4·60	8 00	31 86	...	
Pineapple plant	...	...	...	...	5·88	15·02	7·20	...	
Cane tops	...	...	...	...	4·90	6·49	4·78	...	
Cane trash	...	...	...	...	3·20	4·90	4·00	...	
Prickly-pear	Dr. J. White, Dulacca	...	...	...	·48	9·48	19·92	...	From 1·2 to 2·6 in green plant.

Entomology.

REPORT OF MR. E. JARVIS

(Entomologist to the Bureau of Sugar Experiment Stations).

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

With reference to work of a technical nature recently instituted at Gordonvale laboratory, I wish to state that during the past nine months a number of pinned and mounted specimens of insect pests associated with sugar-cane have been collected in this district, comprising 1,056 specimens, representing 425 distinct species. Forty-nine of these are more or less injurious to cane and 34 beneficial, while the remainder comprise miscellaneous species either closely related to the foregoing or incidentally associated with them. The work of rearing and studying the metamorphosis of scarabæidæ affecting cane is being continued, and experiments have been commenced with a view of acquiring information respecting parasitism in this connection.

Referring to the question of useful insects—a matter not hitherto dealt with in these reports—I may mention that the larval form of an eminently predaceous beetle belonging to the family *Elateridæ* has been under continuous observation at the laboratory since November last. This elaterid is extremely voracious, attacking both adult and grub forms of our cane beetles. It occurs sparingly in volcanic and sandy soils around Gordonvale, and in general appearance is not unlike a very large but flattened "wire worm" with highly polished dark-yellowish-brown body and formidable sickle-shaped jaws.

A specimen collected on 6th November, 1914, killed and devoured no less than 126 large cane grubs and four grey-back beetles during a period of seven months, and is still (4th June) in the larval stage and as greedy as ever.

When first caught, it measured about 2¾ in. in length, so had doubtless previously accounted for numerous grubs, but growth has been slow during confinement, in spite of so liberal an allowance of food, and the larva is now 3½ in. long. Additional smaller specimens were collected on 16th November, 1914, and up to the present two of these have between them killed and consumed 206 cane-grubs and a few adult albohirta.

I was fortunate in observing one in the act of eating a cane-beetle that had been placed in its breeding cage. About one-third of the larva was literally buried out of sight in the body of its unfortunate victim, whose neck had been entirely severed to enable the elaterid to push its head through the thorax into the abdomen for the purpose of imbibing its succulent contents. The record of mortality mentioned above was attained by larvæ confined at close quarters with their prey, in cages holding 54 cubic inches of soil. Under normal conditions, however, they would be compelled to hunt for grubs by tunnelling through the ground and might at times have to traverse several feet before locating one; so that, normally, the percentage of grubs destroyed would necessarily be much lower than this, and would also vary in different districts according to the degree of infestation. In localities such as "Green Hills," where soil conditions are congenial and grubs frequently occur in excessive numbers, this predator should be perfectly at home and capable of doing great execution. Field observations have not yet been undertaken, so that I am unable to speak definitely regarding the possibilities of augmenting its sphere of usefulness by artificial means; but apart from economic considerations, consider that the breeding and ultimate identification of this interesting beetle will prove of scientific value.

Mr. R. Illidge, of Brisbane, an authority on the habits of our coleoptera and other insects, informed me that four species of arboreal *Elateridæ,* belonging to genus Alaus, are predatory on various large wood-boring beetles. He has frequently observed larvæ of *Alaus gigas* inhabiting tunnels of its host (*Batocera* sp.) and attacking grubs, pupæ, and even newly emerged imagines of this beetle.

I may mention, too, that a predaceous elaterid (*Pyrophorus luminosus* Ill.) destroys grubs of "May Beetles" (*Lachnosterna*) in the cane fields of Porto Rico.

COMBATING THE GRUB PEST AT CHILDERS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following interesting report from Mr. H. Epps, secretary of the Shire Council, at Childers, with reference to the grub pest:—

"Following on the failure of voluntary action in the endeavour to combat the ravages of the cane-grub, and consequent upon a poll taken to ascertain the views of the ratepayers on the matter, my Council undertook to levy a rate upon the whole of the cane-growing areas within Divisions Nos. 2 and 3, but excluding the Goodwood areas as being too remote and but little if any affected. Such rate was to be

utilised as a fund for the destruction of the pest either as a grub or beetle or in any other way calculated to attain the object sought, the fund to be administered on the recommendations of an advisory board representative of the several interests concerned, who had no executive powers outside those permitted by the Council from time to time.

"The fund raised by the way of rates was further augmented by endowment from the several mills to whom cane was supplied at the rate of 50 per cent. of the rates paid by the contractor to the particular mill, the total sum so raised being further endowed by the Department of Agriculture at the rate of a further 50 per cent.

"The procedure so far adopted for dealing with the pest is as follows:—

"*Receivers.*—Cane-growers were appointed in suitable districts whose duty it was to receive from collectors the grubs or bettles delivered, and after measuring and destroying same to hand to the collector a voucher entitling him to payment on the basis authorised by the board from time to time, on presentation at the office of the local authority on specified dates.

"The particulars as to the origin of the pests so collected have been duly recorded, and it is anticipated will in time lead to the compilation of sufficient data as to the incidence of this pest, and so have some value in the work of combating the pest in future years.

"One factor already appears to be conclusively established, and appears to indicate most clearly the permanent value attaching to systematic collection of the beetle of the pest. Early in 1896 a 'beetle board' was formed in the Isis, which operated only over an area to the south-east of Childers, and which paid for the collection of beetles only. Operations continued until about 1909, and then languished, ceasing altogether in 1910.

"Following on the compilation of data referred to above, it is now demonstrated that only a very small—indeed, almost negligible—quantity of grubs or beetles are being received from this area as against the numbers from areas not previously dealt with in this way. A further illustration of this arises in connection with a large estate in the district. I am advised that the picking of the grub from this property has never been carried out, but very large expenditures have been incurred in treating with various deterrents, notably carbon bisulphide, moth ball, &c., notwithstanding which the fields presented a very bad appearance, and within the last three months about £100 has been paid out for grubs collected from this property; practically as much as has been paid for pests over the whole of the Isis for the year. It is, of course, not safe to dogmatise on a matter of this sort, but the facts so far seem to emphasise the permanent value attaching to sustained effort along the lines hitherto pursued, pending the discovery of more efficacious methods. This is the more important from the fact that not the least of the difficulties encountered in dealing with the grub pest arise from the impossibility of demonstrating tangible results from the action taken."

General Notes.

A POSSIBLE QUEENSLAND INDUSTRY.

EUCALYPTUS OIL.

Through the courtesy of the Curator of the Technological Museum, Sydney, the Department of Agriculture and Stock has received the following information on the extraction of eucalyptus oils:—

"The cost of a plant for extracting eucalyptus oil varies greatly according to the method adopted. A common plant much in use in New South Wales is to use two 400-gallon iron ships' tanks, the condensing being done in a long pipe laid in the bed of a creek. If sufficiently long, the condensation is perfect. Such a plant would cost about £25. If a boiler is used to supply steam, and larger digesters are employed, then the cost would be proportionately greater; in fact, a large plant might run into a considerable amount. This expenditure would only be warranted if the supply of the material were considerable.

"The wholesale value of the oil varies with its constituents, and many classes of oil are obtainable from the eucalypts. The common peppermint oil used for the separation of metallic sulphides is worth about 6d. per lb. at the stills. The eucalyptus oils (those rich in eucalyptol, and not containing phellandrene), and used for pharmaceutical purposes, are worth about 1s. per lb. at the still; the Geranyl acetate oils, 10s. to 12s. per lb.; and the other kinds at various prices. Since the war, the demand for eucalyptus oils has fallen off. There should be a great demand for certain kinds of eucalyptus oils, and this will eventually be the case. The profit is largely governed by the law of supply and demand. The cost of production is made up by cutting the leaves (an expensive item where labour is dear), carting to the still, fitting up the still, and leaves and firing.

"No particular skill is required to distil the oil, but it is necessary to know what material is obtainable from the species to be worked. Although it is now well known that each particular species yields an oil fairly constant in character, yet the products of species vary so much between themselves, and the yields of oil are so variable, that it is desirable to determine the species before work is done on it. The oils of about 160 species of eucalypts have been determined here, so that the data are somewhat complete, and any advice is willingly given here (Technological Museum, Sydney) to those who purpose embarking in the industry."

TO MAKE SOAP.

1. Dissolve 2 lb. of caustic soda (98 per cent.) in about 7 pints of water. Heat to boiling point, and add 12 lb. fat and 3 lb. resin together. Keep boiling until dissolved.

2. The first advice is, not to try and make a caustic lye from ashes and lime, but get reliable caustic soda. Greenbank's 98 per cent. is the

right thing. Next, get a Beaume densometer to test the strength of the lye. Take 30 lb. of pure tallow, 10 lb. resin, and about 4½ lb. of caustic soda (98 per cent.); powder the resin finely, then melt the tallow, and while this is hot stir in the resin until it is melted and well mixed. Dissolve the caustic soda in about 3 gallons of water, making the lye to test 30 degrees Beaume. While the fat and resin are in a hot, melted condition, pour in the lye and keep the mixture stirred, and at a temperature of 180 degrees Fahr., or a little below boiling, for two hours, testing the soap from time to time on the tongue. If all trace of alkali (caustic) disappears, add more lye until the soap, when applied to the tongue, gives a slight biting sensation. If the alkali is too pronounced, add more tallow and stir well to insure perfect mixing. A good newly boiled soap should bite the tongue about as sharply as vinegar; but, as it is kept and matures, this, to a certain extent, passes away.

TO MAKE BLACK PUDDING.

The pig's blood, when fresh caught, must be seasoned with salt and well stirred until quite cold, or it will congeal. Put a quart of grits or groats to soak in each quart of blood one night. Moisten the crumbs of a quartern loaf in rather more than 2 quarts of new milk made hot. Have ready the skins to be filled, perfectly clean. Chop finely a sprig of savory, one of thyme, and one of marjoram. Season with pepper, salt, a few cloves, some allspice, a mite of ginger, and a nutmeg grated. Mix with 3 lb. chopped suet, six eggs beaten and strained, the bread and milk being well beaten, and lastly the groats which were soaked in the blood. When all is well mixed and ready, cut into some dice-shaped pieces some hog's lard. As you fill the skins, drop this in, about every 2 in. Tie in links only half full, and boil them in a large kettle, occasionally pricking them with a fine skewer as they boil, or they will burst before being half-cooked. When boiled, lay them upon straw till cold, then hang them in bags in the kitchen. When wanted, scald them and put them before the fire in a Dutch oven. Some cooks boil the groats in the milk until swelled; then they add more milk when mixing. Leeks are sometimes very finely shredded and added to the other ingredients.

PRICKLY-PEAR BUREAU.

A few years ago this department purchased a B. and H. pear-burner from the Pearsall Mercantile Company, Pearsall, Texas, U.S.A. There is no agent in Queensland for the burners in question, but they could then be landed in Brisbane at a cost of about £4 12s. The cost may, at the present, be somewhat increased. Gasoline for use in the burners is obtainable from the Vacuum Oil Company, Brisbane, at about 2s. 6d. per gallon, in drums containing 3½ gallons.

The gasoline is put into a small tank strongly made of brass and riveted. There is a cast brass head onto which all fittings are screwed. These tanks are tested to 100 lb. to the square inch, and have a small pump attached, like that on a Primus stove, for keeping the pressure

on the burner at about 15 lb. to the square inch. The tank is slung over the right shoulder of a man, lying under his left arm. There is a brass pipe, about 6 ft. long, connected with the tank on a double joint, on the end of which is the burner. In burning pear, the man brings the tank under his arm, takes the pipe in his right hand, and, working the pump, puts the pressure on the burner and lights it. He then moves about the pear, pressing the flame from the burner in and around the leaves of the pear. This he can do without coming in contact with the thorns himself. The tank is filled two-thirds full of gasoline.

The Pearsall Company states that, in the United States, a man provided fodder for 375 head of stock for ninety days with one burner.

The manager of the State Farm, Bungeworgarai, Roma, who used this burner, advises that it does the work claimed for it in an efficient manner when it is properly used. It is quicker and more effective than ordinary fire-scorching, and should prove of great value to persons desirous of feeding pigs on pear, or converting it into silage. He remarked, however, that the cattle would not eat the pear so treated.

POTASH FROM MANGROVE TREES.

Mr. J. C. Brünnich, Agricultural Chemist, states that the best samples of mangrove ash (leaves and twigs) would be worth about £2 per ton, with commercial potash at £14 per ton, and that at the present time the value would be nearly treble.

BANANA STALKS AS PIG FOOD.

The Agricultural Chemist states that if the stalks are chopped up into short lengths, and mixed with pollard, they will prove a useful pig feed. Some time ago, when staying at one of the orchards at Mapleton, Blackall Range, we noted that the horses were almost exclusively fed on chopped banana stems, and the animals were in splendid condition.

TO DESTROY ALGÆ IN BORE WATER.

A measured quantity of Portland cement mixed with a sufficient quantity of boiled linseed oil, to the consistency of thick paint, applied with a brush upon the surface of the iron. The paint should be properly laid on in two even coats. Twenty-four hours should be allowed to intervene between the first and second coats.

"FORD" CARS.

The advent of the petrol engine denotes a new era in the ramification of farm life. Hitherto farm work in all its branches was performed either by manual labour or horse traction. Now, however, the petrol engine has superseded this "old-time" method, and is used from ploughing down to cream separating; and the "one-time" cart has now given place to the motor lorry, whilst the family buggy has been put aside for the touring car. The "Ford" car, which is familiarly known throughout the world, is expressly suitable for farm use owing to its simplicity

of control, its abundance of power, and proved economy; whilst the extraordinarily low price is an added attraction, coupled with the fact that the "Ford" car is the only car that does not undergo an annual alteration, and consequently spare parts can be always obtained no matter how old the car might become. This to a country owner is a most important feature. As an indication of the manner in which "Ford" cars are being sold in Queensland, the Queensland Motor Agency, Limited, of Brisbane, who are agents for the "Ford," inform us that for the six months of the present year they have sold no less than 420 cars, which they claim to represent half of the total cars sold in Queensland.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	June.	No. of Years' Records.	June. 1915.	June. 1914.		June.	No. of Years' Records.	June. 1915.	June. 1914.
North Coast.	In.		In.	In.	*South Coast—continued:*	In.		In.	In.
Atherton	1·94	13	0·61	1·68					
Cairns	2·42	27	2·16	2·79	Nanango	1·96	27	0·26	3·25
Cardwell	1·75	27	1·19	3·75	Rockhampton ...	2·08	27	Nil	5·33
Cooktown	2·02	27	2·06	7·21	Woodford	2·72	27	0·20	5·01
Herberton	1·02	27	0·66	2·13	Yandina	3·89	21	0·34	9·33
Ingham	2·34	22	0·33	9·06					
Innisfail	6·60	27	6·35	8·45					
Mossman	3·46	5	0·60	3·50	*Darling Downs.*				
Townsville	1·45	30	0·02	4·55					
					Dalby	1·64	27	0·34	2·55
					Emu Vale	1·32	17	0·42	1·66
Central Coast.					Jimbour	1·49	24	0·27	2·03
					Miles	1·94	27	0·22	2·91
Ayr	1·45	27	Nil	2·57	Stanthorpe ...	1·92	27	0·91	2·03
Bowen	1·76	27	0·20	4·75	Toowoomba ...	2·24	27	0·67	3·32
Charters Towers ...	1·45	27	Nil	2·92	Warwick	1·69	27	0·67	2·15
Mackay	2·57	27	0·56	9·17					
Proserpine	3·81	11	1·50	12·55					
St. Lawrence ...	2·33	27	0·11	7·09	*Maranoa.*				
					Roma	1·84	25	0·15	2·36
South Coast.									
Biggenden	1·91	14	0·47	2·86	*State Farms, &c.*				
Bundaberg	2·87	27	0·58	2·89					
Brisbane	2·66	64	1·44	4·00	Gatton College ...	1·53	14	0·05	3·01
Childers	2·36	19	0·26	4·53	Gindie	1·50	13	Nil	3·44
Crohamhurst ...	4·29	22	0·78	8·81	Kamerunga Nurs'y	2·85	23	1·99	2·80
Esk	2·02	27	0·65	4·12	Kairi	1·27	3	1·15	1·66
Gayndah	1·70	27	1·47	2·61	Sugar Experiment Station, Mackay	2·20	16	0·42	8·98
Gympie	2·37	27	0·29	5·58	Bungeworgorai ...	1·71	3	0·03	2·38
Glasshouse M'tains	4·68	6	0·23	7·85	Warren	2·68	3	Nil	1·54
Kilkivan	1·90	27	Nil	3·53	Hermitage ...	2·01	7	0·40	2·34
Maryborough ...	2·87	27	0·82	6·44					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

Answers to Correspondents.

FATTENING SHEEP.

J. W. EVANS, Rosewood—

Question.—I was thinking of fattening some sheep. What is a fair price to pay?

Mr. W. G. Brown, Instructor in Sheep and Wool, replies:—

"1. The price, as a rule, is governed by conditions. At present many sheepowners in the West are very short of feed, and consequently their spare stock is on the market at any decent price they can secure. At present you may buy good wethers in store condition at from 6s. to 8s. off shears; 6d. to 7d. per month may be added for wool grown since shearing.

"2. How long will they take to fatten on lucerne? On lucerne sheep should fatten in from four to five weeks if the supply of feed is kept up to them.

"3. From six to seven sheep can be fattened per acre easily at this time of the year (May).

"4. I recommend crossbreds if you can get them, and buy with good fresh mouths. Merinos will fatten, but more slowly. My quotation above is for Merinos."

COCHINEAL.

"COCHINEAL," Gayndah—

Cochineal is used for dyeing purposes, producing a beautiful scarlet colour. In medicine it is only employed to give a pleasant tint to other preparations. It is imported from Mexico, the West Indies (particularly Jamaica), the Canary Islands, the United States, and Guatemala. More than 1,500,000 lb. have been brought annually to Europe. Some idea may be formed of the vast number of these creatures from the fact that each pound is supposed to contain 70,000 insects. It is a mistake to suppose that the insect will live on any variety of prickly-pear. Its principal food is the nopal plant, *Opuntia coccinellifera.* There are two principal varieties—silver cochineal, which has a greyish-red colour, the furrows of the body covered with a white bloom or fine down; and black cochineal, which is of a dark reddish-brown, and destitute of bloom. The former is of the most value. The male insect is winged, but the female is wingless, and when fully grown is about the size of a barleycorn, weighing about one-tenth of a grain. It is the dried body of the female which forms the cochineal of commerce. The insects are gathered about three times a year, when they are carefully brushed from the cactus leaves into bags, and are then killed by immersion in hot water, or by exposure to sun, steam, or the heat of an oven, losing by this process about two-thirds of their weight. The dried insects have been known to keep undecayed for sixty and even a hundred

years. The average price used to be from 6s. to 9s. per lb. We cannot say what the present price is. Probably aniline dyes have largely replaced the insect product.

The cochineal insect has been brought to Queensland and sent to that part of the State where a species of cactus is found on which it thrives. Write to Dr. Jean White Hanify, Experiment Station, Dulacca, or to the Under Secretary, Department of Public Lands, for information.

PRUNING CUSTARD APPLES.

"PRUNING," Cleveland—

Mr. C. Ross, F.R.H.S., Instructor in Fruit Culture, gives the following advice:—

"Nearly all trees of the custard apple family have a spreading or pendulous habit, and the lower branches will soon sweep the ground if allowed to do so. It is necessary that the superstructure of the tree be established on a fairly high stem—*i.e.*, the framework of the main limbs should start at a point not less than 3 ft. from the ground. The method of pruning found most satisfactory is as follows:—

"Lift the head of the tree by cutting away all the portions of the under branches within 12 in. or 18 in. of the ground. As the higher branches continue their downward tendency, this will be an annual operation. Be careful not to thin out the head of the tree too much, as the habit of growth provides for sufficient light and air; but, as the fruit is borne on the old wood, a modified system of long spur pruning is advisable. Side shoots, laterals, and some of the strong leaders may be shortened back to one-half or two-thirds of their length. It should be remembered that severe top pruning produces more wood and less fruit. Judicious pruning is always beneficial, but be more sparing with the knife on extra vigorous trees."

DRIFT SAND IN WELL-SINKING.

A correspondent writes that, in sinking a well, a layer of fine sand to a depth of 7 ft. or 8 ft. was met with at a depth of 20 ft., making it very difficult to continue sinking. Mr. A. Morry, Departmental Surveyor, in reply, states:—

"What is undoubtedly required is an iron cylinder in two sections of about 4 ft. each long. These would, however, be difficult to handle owing to their great weight. Wood cylinders about 1½ in. thick could be made to answer the purpose if constructed of silky oak or some other hardwood, and well tarred before fixing in position. This would last a long time. The cylinders should fit well together, or sand will flow constantly into the interior. Any cooper would soon put them together. If a good water supply is obtained, it may be worth while putting a concrete lining from the bottom to a point above the sand drift, which would be a permanent job. In putting down the cylinders, care must be taken to keep them perpendicular, or they will collapse."

[A similar case occurred on a sugar plantation ("Ormeau," Pimpama) in 1869. A well was being sunk to obtain a supply of water for the mill. A stratum of fine drift mud, at a depth of 18 ft., prevented further sinking. An engineer who happed to be staying at the plantation advised the same course as the above. The cylinders were made of silky oak, the joints being treated with "chunam" (tar and ashes). Five years later the wooden casing, 2 in. thick, was in a perfectly sound condition.—Ed. "Q.A.J."]

DRENCH FOR SHEEP.

"L.M.C.," Kia Ora, Baking Board—

In reply to a question as to the best drench for sheep with worms, Mr. W. G. Brown, Instructor in Sheep and Wool, advises:—

"The best drench I know is the arsenical, the composition of which is—2 oz. arsenic, 6 lb. Epsom salts, and 5 gallons of water. Take a 5-gallon oil-drum, and put about 2½ gallons of water in it, and place upon a fire. When the water is boiling add the arsenic and Epsom salts; boil them for three-quarters of an hour, stirring occasionally; then add water to the mixture to make 5 gallons. The drench is then fit for use.

"Dose.—2 oz. (fluid) for sheep over 18 months, 1½ oz. for sheep under 18 months, and 1 oz. for lambs up to 6 months.

"Young lambs sucking their mothers up to two months do not require drenching."

A PLANT POISONOUS TO SHEEP.

J. E. Markey, Yandilla—

The plant forwarded by you, which you believe to be responsible for heavy mortality amongst your sheep, is stated by Mr. F. M. Bailey, Colonial Botanist, to belong to *Euphorbia Drummundi*, and is commonly looked upon in Queensland as poisonous to sheep. In Bailey and Gordon's book, "Plants Reputed Poisonous to Stock," appears the following:—

"This weed is unquestionably poisonous to sheep, but when in a dry state seems to be comparatively, if not entirely, inocuous. It has been observed when eaten by sheep in the early morning, before the heat of the sun has dried it up, it is almost certain to be fatal. It is seldom eaten to excess except by travelling sheep, and when grass is scarce."

CITRUS TREES SUITABLE FOR THE BURNETT DISTRICT.

Mr. C. Ross, Instructor in Fruit Culture, in reply to a correspondent who proposes to establish a vineyard and citrus orchard on a frontage to the Burnett River, on the Gayndah Line, and asks for information as to the best variety of citrus fruits for bearing, packing, and export, recommends the following varieties:—

Orange: Navel, Jaffa, Valencia, and Mediterranean Sweet.

Mandarin: Beauty of Glen Retreat, Emperor, and Scarlet.

Lemons: Villa Franca, Lisbon, and Messina.

Any of the Brisbane nurserymen should be able to supply.

COLLAR ROT OF CITRUS TREES.

F. GORE JONES, Mount Mee—

From your description, I believe your lemon trees are attacked by a disease called mal-de-goma, or collar rot. This may result from bad drainage, or a small borer may have set up the gumming. Clear away the soil and loose bark from the stem and upper roots. Carefully examine for borers, and probe any orifices with a wire, and stop with hard soap. Cut away decayed wood and gumming bark with a very sharp knife, and dab the wounds with coal tar or dilute carbolic acid. If the subsoil is clayey, it should be drained at once. Deep planting often causes the disease; also organic manures near the stem.

OATS IN THE TOLGA DISTRICT.

In reply to a correspondent at Tolga, as to the advisability of planting oats at Tolga, Mr. Quodling, Agricultural Inspector, states that oats in that district are susceptible to rust, and if the season is at all favourable for raising a hay crop during the winter months, canary seed is to be preferred. The plant is unaffected by rust, and has proved invaluable as a hay crop in the Rockhampton district, at the Warren State Farm; 14 lb. of seed is sufficient for an acre of ground, if drilled. When broadcasted, use from 20 to 24 lb. of seed. Late April and May are seasonable periods to plant.

PRICE OF WHEAT PER QUARTER.

"WHEAT-GROWER," Warwick—

The price of wheat in the home markets is generally given at per quarter. The same with oats and often with maize. Suppose oats (40 lb. per bushel) are quoted at 16s. per quarter. A quarter is 8 bushels. Divide by 8 and you have the price per bushel—2s. If you wish to reduce the price per quarter to price per ton, in the case of oats at 16s. per quarter, multiply the price by 7 and you have 112s. = £5 12s. per ton. Or, again, maize (60 lb. per bushel) at 17s. per quarter, multiply the price by 4·66 which gives £4 per ton. Or wheat at 62 lb. per bushel, multiply the price per quarter by 4·51—price per quarter, 60s.; per ton, 270s. = £13 10s.

FEEDING COWS WITH WASTE ORANGES.

The utilisation of waste oranges for feeding milking cows has been proved, by experiments at the Roma State Farm, to be valueless. Waste citrus fruits were fed to some cows, and the effect was most pronounced, not only in the flavour of the milk, but in that of the cream and butter. The taint was so strong that all the products mentioned were almost unsuitable for human use. However, there is no reason why the oranges should not be used when feed is scarce. We have no analysis of oranges to show their value for food for stock in this way, but no doubt they will assist in maintaining the animals in a more satisfactory condition.

PECAN NUTS AND GRAPES.

S. ROWE, Nagoorin, Gladstone—

"In reply to your inquiries," writes Mr. C. Ross, Instructor in Fruit Culture, "seeds of Pecan nuts can be had from Mr. Pentecost, Helidon. The varieties of grapes recommended are—Syrian, Royal Ascot, Snow's Muscat, Gros Colman, Black Hamburg, Wilder Goethe, Iona, and Chasselas; also a few Isabella, useful for jam."

STARTING AN ORCHARD.

W. RUSSELL, Cloncurry—

Mr. C. Ross, Instructor in Fruit Culture, advises beginning with worked trees. Seedlings are constitutionally hardier and grow to a larger size, but they do not become profitable for many years after named varieties. They are very serviceable, however, if planted as a breakwind on the outer rows of an orchard. For a large plantation it is advisable to plant such varieties as will succeed each other for marketing, rather than one variety to come in at once.

The following is a good selection:—Oranges: White Siletta, Babina, Jaffa, Joppa, and Late Valencia. Mandarins: Beauty of Glen Retreat, Emperor, and Scarlet.

TREATING A FISTULA.

A correspondent writes that he has a horse with a fistula on the withers, giving off a mattery discharge from a deep hole on the top of it, and asks for a cure. Mr. McGowen, Government Veterinary Surgeon, advises as follows:—

"A case such as this requires an operation to be performed, which should only be done by a qualified veterinary surgeon; but, in the meantime, it would be advisable to inject into the sinuses from which the matter is discharging, morning and evening, the following solution by means of a glass syringe:—Bichloride of mercury, 1 dr.; water, 10 oz. A 1-oz. syringe, which contains one dose, should be used."

COWS CHEWING BONES.

W. KIRK, Wetheron—

Mr. Kirk asks the cause of and remedy for his cattle dying, apparently owing to their going lame, after chewing bones, mostly in the shoulder. When examined after death, the bones appeared to be decayed in the joints. The matter was referred to a veterinary surgeon of the Stock Department, who says—

"The animals are suffering from a disease known as osteomalacia, or soft bone, caused by a deficiency of lime in the soil. I would advise Mr. Kirk to put his animals onto the lick recommended by this Department, which is as follows:—Bonemeal, 1 lb.; carbonate of iron, 4 oz.; gentian, 4 oz.; common salt, 8 oz.; fenugreek, 4 oz. Mix thoroughly, and give one tablespoonful to each animal three times daily in food. This mixture can be had from any wholesale chemist."

ANALYSIS OF PRICKLY-PEAR.

Mr. J. C. Brünnich, Agricultural Chemist, gives the analysis of the prickly-pear as follows:—"100 lb. of prickly-pear (average quality) contains ½ of proteids, 5½ lb. of carbohydrates, 1 lb. of fibre, and $\frac{1}{10}$ lb. of fat (all digestible constituents). A cow should consume from 40 to 80 lb. of the prepared sliced pear daily, and will require some roughage like bush hay, or wheat straw, and some food rich in proteids, like oilcake or cotton-seed meal, in addition."

MIXING ARSENIC AND CAUSTIC SODA.

A corespondent asks whether it is necessary to boil arsenic and caustic soda in order to dissolve it. A mixture of these ingredients showed a deposit next day, and he asks if this deposit is an adulterant or really arsenic.

Mr. J. C. Brünnich, Agricultural Chemist, to whom the question was referred, advises as follows:—"A mixture of arsenic and caustic soda does not require boiling. It is best to mix the dry arsenic and caustic soda intimately, and add water slowly. Any residue left is generally sand or other impurity. None of the commercial arsenic contains, as a rule, more than 90 to 94 per cent. of arsenious acid, which is a good purity for a commercial raw product."

LE HUGUENOT AND CRETAN WHEATS.

These are both macaroni wheats, and, although the grain of each could be milled, the resulting flour would be dark and not suitable unless blended with a large percentage of flour made from bread wheats. Le Huguenot is a bald wheat which resembles "Bald Medeah." It is an excellent variety for growing in coastal situations for green feed, for silage crops, and for hay. If a satisfactory grain crop is obtained, such could be used for macaroni making, or as a feed for poultry and stock. This variety is a fair rust and smut resister.

Cretan is a bearded wheat, the grain of which can be used similarly to the above. It is also a good wheat for green feed and for silage purposes, but the presence of the "beard" makes it unsatisfactory as a hay crop. This variety possesses excellent rust-resisting qualities.

SOLID GROUND WHEN EXCAVATED.

A correspondent asks: How many cubic yards of loose muck (placed in a bank) are produced from 1 cubic yard of solid ground, say, hard clay, picked or ploughed? The question was submitted to Mr. A. Morry, surveyor to this Department, who advises as follows:—

"Solid ground, such as hard clay, will increase in bulk when excavated, so that one cubic yard will then be equal to 1¾ cubic yards. Rock, when excavated, will double itself—that is, 1 yard cube will then be equal to 2 yards."

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JULY, 1915.

Article.		JULY. Prices.
Bacon	lb.	8½d. to 10½d.
Bran	ton	£10 10s.
Butter	cwt.	215s.
Chaff, Mixed	ton	£10 10s. to £12
Chaff, Oaten	"	£13 10s.
Chaff, Lucerne	"	£13 5s.
Chaff, Wheaten	"	£8
Cheese	lb.	1s. to 1s. 0¾d.
Flour	ton	£16 10s.
Hams	lb.	1s. 1d.
Hay, Oaten (Victorian)	ton	£16
Hay, Lucerne	"	£10 to £16
Honey	lb.	3½d.
Maize	bush.	5s. 5d.
Oats	"	6s. 6d.
Onions	ton	£10 to £10 5s.
Peanuts	lb.	3½d.
Pollard	ton	£10 10s.
Potatoes	"	£13 to £13 5s.
Potatoes (Sweet)	cwt.	4s. 9d.
Pumpkins	ton	£4 to £5
Sugar-cane	"	36s.
Eggs	doz.	1s. 3d. to 1s. 6d.
Fowls	pair	2s. 9d. to 4s. 6d.
Ducks, English	"	3s. to 3s. 9d.
Ducks, Muscovy	"	3s. to 4s. 3d.
Turkeys (Hens)	"	7s. to 8s.
Turkeys (Gobblers)	"	10s. to 15s.
Wheat	bush.	8s.

VEGETABLES.

Cabbages, per dozen	2s. 6d. to 5s. 6d.
Cauliflowers, per dozen	8s. to 12s.
Beans, per sugar bag	6s. to 9s.
Beetroot, per dozen bunches	9d. to 1s.
Carrots, per dozen bunches	1s. to 1s. 6d.
Chocos, per quarter-case	1s. 6d. to 2s. 9d.
Cucumbers, per dozen	...
Custard Marrows, per dozen	2s. 6d. to 3s.
Vegetable Marrows, per dozen	2s. to 5s.
Lettuce, per dozen	...
Peas, per sugar bag	4s. to 6s. 6d.
Celery, per dozen bunches	10d. to 1s. 9d.
Sweet Potatoes, per cwt.	4s. to 4s. 9d.
Table Pumpkins, per cwt.	5s. to 5s. 7d.
Tomatoes, per quarter-case	3s. 6d. to 7s.
Turnips, per dozen bunches	10d. to 1s. 3d.
Rhubarb, per bundle	1s. to 1s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	JULY. Prices.
Bananas (Queensland), per case	14s. to 18s.
Bananas (Fiji), per case	20s. to 21s.
Bananas (G.M.), per case	20s. to 21s.
Mandarins, per case	3s. 6d. to 5s. 6d.
Oranges (Navel), per case	5s. to 8s.
Oranges (Other), per case	3s. to 5s. 6d.
Passion Fruit, per quarter-case	2s. to 9s.
Lemons, per bushel case	2s. 6d. to 6s.
Papaw Apples, per half-case	...
Pineapples (Queens), per case	6s. to 8s.
Pineapples (Ripleys), per case	4s. 6d. to 7s.
Pineapples (Common), per case	4s. 6d. to 7s.
Tomatoes, per quarter-case	5s. to 8s.
Cucumbers, per case	6s. to 8s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	JULY. Prices.
Apples (Tasmanian), per case	8s. to 10s.
Apples, Cooking, per case	6s. to 7s. 6d.
Apricots, per quarter-case	...
Bananas (Cavendish), per dozen	$1\frac{1}{2}$d. to $3\frac{1}{2}$d.
Bananas (Sugar), per dozen	1d. to 3d.
Cape Gooseberries, per quarter-case	9s. to 10s. 9d.
Cherries, per quarter-case...	...
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter-case	2s. to 2s. 9d.
Custard Apples, per quarter-case	4s. to 5s. 6d.
Granadillas, per bushel case	3s. 6d. to 6s.
Lemons (Lisbon), per case	3s. to 6s.
Limes (Choice), per quarter-case	...
Mandarins, per half-case	2s. 6d. to 7s.
Mangoes, per quarter-case	...
Nectarines, per quarter-case	...
Oranges (Navel), per case	5s. 6d. to 6s. 6d.
Oranges (Seville), per cwt.	9s. 6d.
Oranges (other), per cwt.	2s. 6d. to 4s. 6d.
Papaw Apples, per quarter case	9d. to 1s.
Papaw Apples (Prime), per quarter-case	1s. to 3s.
Passion Fruit, per quarter-case	3s. 6d. to 5s.
Peaches, per quarter-case	...
Peanuts, per pound...	3d. to $3\frac{1}{2}$d.
Pears (Victorian), per case	...
Rosellas, per sugar bag	...
Persimmons, per quarter-case	...
Pineapples (Ripley), per dozen	1s. 6d. to 1s. 9d.
Pineapples (Rough), per dozen	9d. to 1s. 3d.
Pineapples (Smooth), per dozen	1s. 6d. to 3s.
Strawberries, per tray	2s. to 3s.
Strawberries, per dozen pint boxes	8s. to 12s.
Tomatoes, per quarter-case	2s. to 4s.

TOP PRICES, ENOGGERA YARDS, JUNE, 1915.

Animal.	JUNE.
	Prices.
Bullocks	£13 5s. to £17 2s. 6d.
Bullocks (single)	£20 2s. 6d.
Cows	£12 2s. 6d. to £15 2s. 6d.
Merino Wethers	34s.
Crossbred Wethers	38s. 3d.
Merino Ewes	30s. 6d.
Crossbred Ewes	45s. 6d.
Lambs	32s.
Pigs (Porkers)	52s.

LONDON QUOTATIONS.

LONDON, 24th July.

Danish butter is quoted at 162s. to 166s. per cwt.

The market for frozen rabbits is firm. New South Wales blues, ex store, are quoted at 20s. to 21s. per crate.

Jute, August shipment from Calcutta, £24 to £24 15s. per ton.

Hemp, July-September shipment, £31 10s. per ton.

Rubber, fine hard Para, 2s. 6d. per lb.; plantation first latex crepe, 2s. 6d.; smoked sheet, 2s. 5½d.

The Liverpool quotation for middling American cotton, July-August shipment, is 5·08d. per lb.

Copra, South Sea, August-September shipment, £21 10s. per ton.

Raw linseed oil, spot pipes, £26 5s. per ton.

NOTICE.

All communications in connection with the Journal, inquiries, &c., should be addressed to "The Editor" only. Letters addressed personally are liable to delay in reply.

No replies can be given to Anonymous letters. The writers are requested to sign their communications, not necessarily for publication.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

COMPUTED BY D. EGLINTON, F.R.A.S.

Date.	May.		June.		July.		August.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets	Rises.	Sets.
1	6·14	5·17	6·31	5·0	6·39	5·3	6·30	5·18
2	6·14	5·16	6·31	5·0	6·39	5 3	6·30	5·18
3	6·15	5·15	6·32	5·0	6·39	5·3	6·29	5·19
4	6·15	5·14	6·32	5·0	6·40	5·4	6·28	5·20
5	6·16	5·13	6·33	4·59	6·40	5·4	6·27	5·21
6	6·17	5·12	6·33	4·59	6·40	5 4	6·27	5·21
7	6·17	5·12	6·34	4 59	6·40	5·5	6·26	5·21
8	6·18	5·11	6·34	4·59	6·40	5·5	6 25	5 22
9	6·18	5·11	6·34	4·59	6·40	5·5	6 24	5·22
10	6·19	5·10	6·35	4·59	6·40	5·6	6·24	5·22
11	6·19	5·10	6·35	4·59	6·39	5·6	6·23	5·23
12	6·20	5·9	6·35	4·59	6·39	5·6	6·23	5·23
13	6·20	5·9	6·35	4·59	6·39	5·7	6·22	5·24
14	6·20	5·8	6·36	4·59	6·39	5·7	6·21	5·25
15	6·21	5·8	6 36	5·0	6·38	5·8	6·20	5·26
16	6·21	5·7	6·36	5·0	6·38	5·8	6·19	5·26
17	6·22	5·6	6·37	5·0	6·38	5·9	6·18	5·26
18	6·22	5·5	6·37	5·0	6·37	5·10	6·17	5·27
19	6·23	5·5	6·37	5 0	6·37	5·11	6·16	5·27
20	6·23	5·4	6·38	5·0	6·36	5·12	6·15	5·27
21	6·24	5·4	6·38	5·0	6·36	5·12	6·14	5·28
22	6·24	5·4	6·38	5·0	6·36	5·12	6·13	5·28
23	6·25	5·3	6·38	5 0	6·35	5·13	6·12	5·29
24	6·25	5·3	6·38	5·1	6·35	5·13	6·11	5·29
25	6·26	5·3	6·39	5·1	6·35	5·13	6·10	5·30
26	6·26	5·2	6·39	5·1	6·34	5·14	6·9	5 30
27	6·27	5·2	6·39	5·2	6·34	5 14	6 8	5·31
28	6·28	5·2	6·39	5·2	6·33	5·15	6·7	5·31
29	6·29	5·1	6·39	5 2	6 32	5·16	6·6	5·32
30	6·30	5·1	6·39	5·3	6·31	5·17	6·5	5·32
31	6·30	5·1	...	...	6·31	5·17	6·5	5·33

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H.	M.
6 May	☽	Last Quarter	3	22 p.m.
14 „	●	New Moon	1	31 „
22 „	☾	First Quarter	2	50 „
29 „	○	Full Moon	7	33 a.m.

The moon will be at its brightest not only when full, but because it will this month be at its least distance from the earth at that time.

5 June	☽	Last Quarter	2	32 a.m.
13 „	●	New Moon	4	57 „
21 „	☾	First Quarter	12	24 „
27 „	○	Full Moon	2	27 p.m.

The moon will be at its greatest distance from the earth on 11th June at 10 a.m., and nearest on the 26th at midday.

4 July	☽	Last Quarter	3	54 p.m.
12 „	●	New Moon	7	30 „
20 „	☾	First Quarter	7	9 a.m.
26 „	○	Full Moon	10	11 p.m.

The moon will be at its greatest distance from the earth on 8th July, about 9 p.m. and at its nearest on the 24th at 3·24 p.m.

3 Aug.	☽	Last Quarter	7	27 a.m.
11 „	●	New Moon	8	52 „
18 „	☾	First Quarter	12	17 p.m.
25 „	○	Full Moon	7	40 a.m.

The moon will be at its greatest distance from the earth on 5th August at 36 minutes after 12, midday, and at its nearest on the 20th about midnight.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun will rise and set about 4 minutes later than at Brisbane, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes, respectively, later than at Brisbane.

At Roma the times of sunrise and sunset during May, June, July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given for Brisbane.

The moonlight nights each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case it will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably with regard to the ecliptic.

Farm and Garden Notes for September.

FIELD.—Spring has now arrived, and with it there will be the usual trouble with weeds, especially on carelessly prepared ground. Therefore, the cultivator and the horse and hand hoe must be kept vigorously at work to check the weed pests and save the growing crops as well as much future labour. Attend to earthing up any crop which may require it. There may possibly occur drying winds, dry weather, and even very late frosts, which have not been unknown in parts of this State even as late as September. Still, good showers may be looked for in October, and much useful work may be done during the present month which will go far to afford a fair prospect of a good return for labour. Plant out *Agave rigida*; var. Sisalana (sisal hemp plant), in rows 6 to 8 ft. apart, according to the richness of the soil. All dry places on the farm, too rocky or too poor for any ordinary crops, should be planted with this valuable aloe. Especially should limestone country be selected for the purpose. If the soil is very poor, and the plants very small, it is better to put the latter out into a nursery of good soil, about 1 ft. apart. Next year they will be good-sized plants. Keep down tall weeds in the plantation, and do not allow couch or buffalo grass to grow about the roots. Sisal will do no good if planted on low-lying wet land, or on a pure sandy soil. It thrives best where there is plenty of lime, potash, and phosphoric acid, all of which (except potash, unobtainable under present war conditions) can be cheaply supplied if wanting in the soil. Sisal requires so little labour from planting to maturity that it can be grown to good profit despite the high cost of white labour. Sow cotton—Sea Island near the coast, and Uplands generally. Caravonica succeeds best in North Queensland. Sow maize, sorghum, imphee, mazzagua, Indian cane, prairie grass, Rhodes grass and paspalum, panicum, tobacco, pumpkins, and melons. Sugar-cane planting should be vigorously carried on. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, ginger, and canaigre, the latter a tuber yielding a valuable tanning substance. Plant out coffee.

KITCHEN GARDEN.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or

kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft. apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohl-rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

FLOWER GARDEN.—Continue to plant bulbs as directed last month. Protect the plants as much as possible from cold westerly winds, which may still occur, notwithstanding the increasing temperature. Be careful that the bulbs do not come in contact with fresh manure. Keep a good lookout for slugs. Plant out chrysanthemums, palms, and all kinds of tropical and semi-tropical plants. If hot weather should ensue after planting, water and shade must be given. Sow dianthus, snapdragon, and coleus, seed or cuttings of the latter. Roses will now be in full bloom. Keep them free from aphis, and cut off all spent blooms. This latter work should be done in the case of all flowers. If you wish to save seeds, do not wait for the very last blooms, but allow some of the very best to go to seed. If you have any toads in the garden or bush-house, encourage them to take up their abode there. They are perfectly harmless, in spite of their ugliness, and they destroy an astonishing number of insects injurious to plants. Fill up all vacancies with herbaceous plants. Sow zinnia, gaillardia, amaranthus, cockscomb, balsam, sunflower, marigold, cosmos, summer chrysanthemum, coreopsis, portulaca, mesembryanthemum, calendula, &c.

Orchard Notes for September.

THE SOUTHERN COAST DISTRICTS.

The marketing of citrus fruits, in the later districts, of the late winter or early spring crop of pines and bananas, also of strawberries and Cape gooseberries, will continue to occupy the attention of fruit-growers. We can only repeat the advice we have so often given in these Notes respecting the marketing of all kinds of fruit—viz., to grade the fruit evenly, pack honestly, and display it to the best advantage if you want to get good returns.

September is a very important month to the fruit-grower, owing to the fact that it is usually a dry month, and that it is essential in all cases

to keep the land in a high state of tilth, so as to retain the moisture that is required by the various trees that are in blossom, thus securing a good set of fruit. Where irrigation is available, it is advisable to give the trees a good watering should the ground be dry, as this will induce a good growth and cause the fruit to set well. If an irrigation is given, it should be a thorough one, not a mere surface watering, and once the land is saturated the moisture must be retained in the soil by constant and systematic cultivation. If this is done, one good watering will usually be enough to carry the trees through in good condition to the thunderstorms that come later or even to the summer rains, if the soil is of a deep sandy loamy nature.

No weeds must be allowed in the orchard or vineyard at this time of the year, as they are robbing the trees and plants of both the water and plant food that are so essential to them at this period of their growth.

There is not much to be done in the way of fighting scale insects during the month, as they are more effectually dealt with later on; but where young trees are showing signs of distress, owing to the presence of scale insects, they should be treated, the gas method being the most efficacious.

Beetles and other leaf-eating insects often make their appearance during the month. The best remedy is to spray the trees or plants with one or other of the arsenical washes that are recommended by me in this journal. The vineyard will require considerable attention. Not only must it be kept well worked, but any vines that are subject to the attack of black spot must be sprayed from time to time with Bordeaux mixture. Disbudding must be carefully carried out, as this work is equally as important as the winter pruning, as it is the best means of controlling the future shape of the vine. A very common fault with vines grown in the coast districts is that the buds often remain dormant, only the terminal bud and possibly one other starting into growth, thus leaving a long bare space on the main rods, which is undesirable. When this takes place, pinch back those shoots that have started, and which are taking the whole of the sap, and force the sap into the dormant buds, thus starting them into growth. This will result in an even growth of wood all over the vine—not a huge cane in one part and either a stunted growth or dormant buds on the rest.

Every care should be taken during the month to prevent the fruit-fly from getting an early start. All infested oranges, loquats, kumquats, or other fruits should be gathered and destroyed, as the keeping in check of the early spring crop of flies, when there are only comparatively few to deal with, will materially lessen the subsequent crops. Land that is to be planted to pines or bananas should be got ready now, though the planting need not be done till October, November, or even later. Prepare the land thoroughly; don't scratch the surface to the depth of a few inches, but plough as deeply as you have good surface soil, and break up the subsoil as deeply as you can possibly get power to do it. You will find that the extra money expended will be a profitable investment, as it will pay every time.

TROPICAL COAST DISTRICTS.

September is usually a very dry month, and fruit trees of all kinds suffer in consequence. The spring crop of citrus fruits should be harvested by the end of the month, as, if allowed to hang later, there is a great risk of loss by fly. The fruit should be well sweated; and, if carefully selected, well-graded, and well packed, it should carry well to, and fetch high prices in, the Southern States, as there are no oranges or mandarins grown in Australia that can excel the flavour of the best of the Bowen, Cardwell, Cairns, Port Douglas, or Cooktown fruit.

As soon as the fruit is gathered, the trees should be pruned and sprayed with the lime and sulphur wash, as this wash is not only a good insecticide, but it will keep down the growth of all lichens, mosses, &c., to which the trees are very subject.

Every care should be taken to keep down the crop of fruit-fly during the month. All infested fruit should be gathered and destroyed, particularly that in or adjacent to banana plantations. Watch the banana gardens carefully, and keep well cultivated. New land should be got ready for planting, and where land is ready planting can take place.

Papaws and granadillas are in good condition now, and, if carefully gathered and well packed in cases only holding one layer of fruit, they should carry well to the Southern markets if sent in the cool chamber.

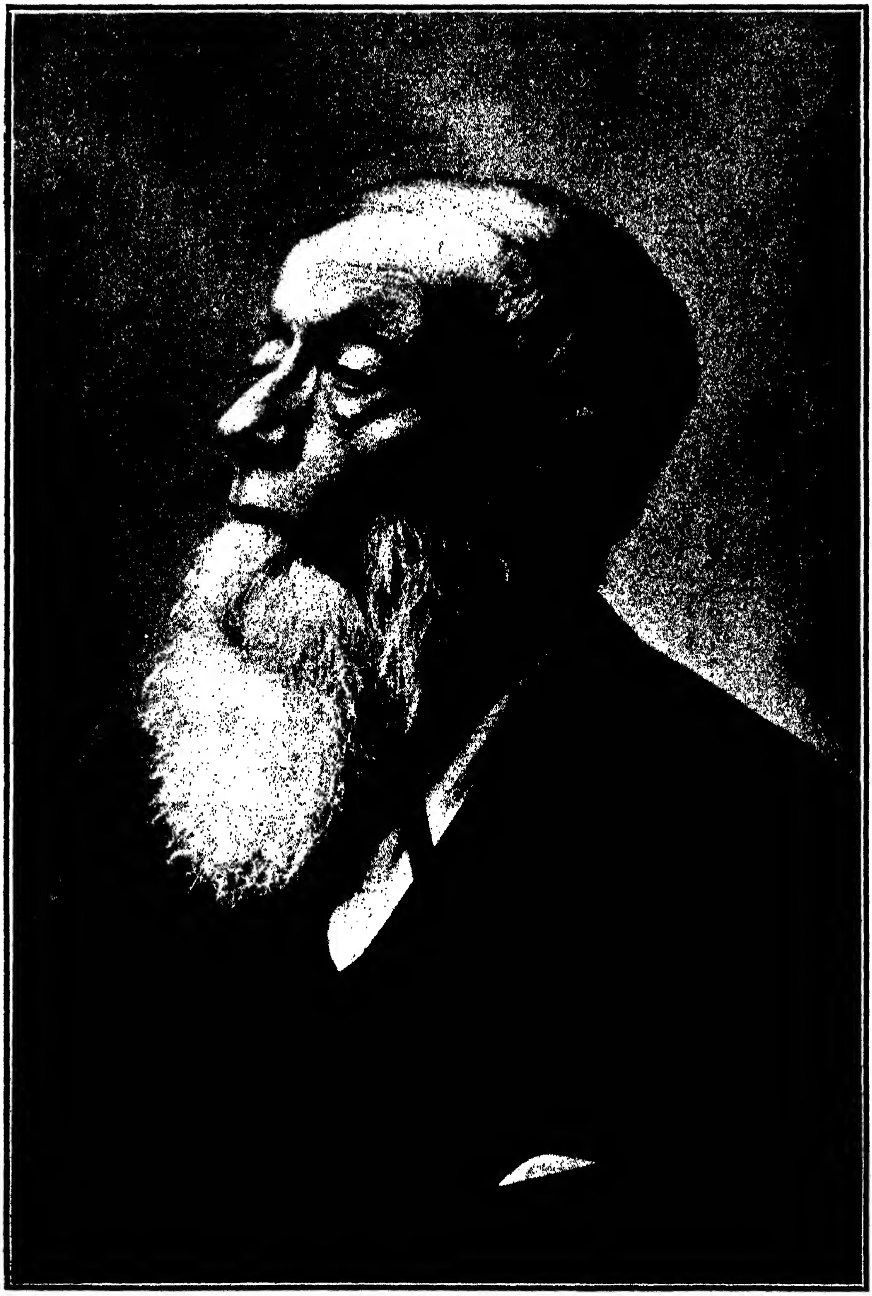
SOUTHERN AND CENTRAL TABLELANDS.

Prune grape vines at Stanthorpe in the early part of the month, leaving the pruning as late as possible, as the object is to keep the vines back in order to escape damage from late spring frosts. All vines subject to the attack of black spot should be treated with the winter dressing when the buds are swelling; this treatment to be followed by spraying with Bordeaux mixture later on.

Where fruit trees have not received their winter spraying, they should be treated at once before they come out into flower or young growth. Where the orchard or vineyard has not been ploughed, do so, taking care to work the land down fine as soon as it is ploughed, so as to keep the moisture in the soil, as the spring is always the trying time for fruit trees.

Look out for fruit-fly in the late oranges and loquats in the Toowoomba district. Keep the orchards and vineyards well cultivated; disbud the vines when sufficiently advanced. Spray for codlin moth.

In the Central tablelands irrigate vines and fruit trees, and follow the irrigation with deep, constant, and systematic cultivation. Keep down all weed growth, and fight the red scale on citrus trees with cyanide. The objective of the fruit-growers throughout Queensland during September and the following months is, "How best to keep the moisture in the soil that is required by the trees, vines, plants, and vegetables"; and this objective can only be obtained by irrigation where same is available, or by deep, systematic, and constant cultivation where there is no water available for irrigation.



THE LATE MR. F. M. BAILEY, C.M.G., F.L.S.

The accompanying portrait of the late much-esteemed Colonial Botanist, Mr. F. M. Bailey, was, owing to an oversight, omitted in our August issue. Mr. Bailey always wished to retain his original title of "Colonial," in preference to "Government," Botanist.

[*Frontispiece.*

QUEENSLAND AGRICULTURAL JOURNAL

VOL. IV. SEPTEMBER, 1915. PART 3.

Agriculture.

COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDENS.

CUCUMBERS.

This vegetable may be grown on almost any soil, as long as it is fairly light and loamy, and plenty of manure is added. The pits or hills should be prepared by mixing a large amount of well-rotted stable manure, sheep or fowl dung, ashes, and bonedust with the soil.

Apply in addition the following artificial fertilisers:—

3 to 4 cwt. of superphosphate
1½ to 2 cwt. of sulphate of potash
1½ cwt. of sulphate of ammonia or nitrolim
} per acre;

or the same amounts in pounds to every 43 square yards.

An excessive amount of nitrogenous manure, more particularly in

the form of quick-acting nitrates, may cause an excessive growth of vines and poor quality of cucumbers.

LEEKS and ESCHALOTS.

These vegetables require a deep, rich, sandy loam, a liberal manuring with stable manure, ashes, bonedust, &c., when preparing the bed, and a copious supply of liquid manure during their growth.

A complete fertiliser is made up as follows:—

4 to 6 cwt. superphosphate
1 to 1½ cwt. sulphate of potash
2 to 3 cwt. sulphate of ammonia or nitrolim } per acre;

or the same quantities in pounds to every 43 square yards.

LETTUCE.

Lettuce requires a rich loam, in order to grow very quickly, and in good soil the addition of artificial fertilisers will produce large crisp plants.

Use per acre 8 to 12 cwt., or per square yard 3 to 4 oz., of a fertiliser containing 6 to 8 per cent. phosphoric acid, 4 to 6 per cent. nitrogen, and 8 to 10 per cent. potash; or the following mixture:—

4 to 6 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
2 to 4 cwt. nitrolim or sulphate of ammonia } per acre.

LUCERNE.

Lucerne, one of our most valuable fodder-plants, grows well on rich loams, and clayey soils, containing plenty of lime, and having a mellow, fairly open, or even gravelly subsoil. Clayey soil, deficient in lime, may be made to grow lucerne if the land is heavily limed with ground limestone, at the rate of one to three tons per acre. Some light sandy soil, with a clayey or gravelly subsoil, may also be made fit for lucerne by liming. Nitrogenous manure is, as a rule, not required, but a small dressing with nitrolim or nitrate of lime, at the rate of ½ to 1 cwt. per acre, at the time of sowing, may act as a stimulus and give the plants a chance to establish themselves in poorer soils. The plant requires an ample supply of potash and phosphoric acid, and an annual application of 3 to 6 cwt. of a fertiliser mixture, containing 6 to 8 per cent. phosphoric acid and 10 per cent. of potash, is to be recommended.

The following manures may be applied broadcast every year:—

2 to 3 cwt. superphosphate
1 to 1½ cwt. sulphate of potash or muriate of potash } per acre;

or,

3 to 4 cwt. Thomas phosphate
1½ to 3 cwt. kainit } per acre

MANGOLDS and SWEDES.

Mangolds, like Swedes and beets, are a very exhaustive crop and require a fairly rich loamy soil. Whenever possible from 10 to 20 tons of well-rotted farmyard manure should be applied, per acre, when

preparing the land for sowing. This crop is one of the few which prefers the potash in the form of chloride or muriate, and if the usual sulphate of potash is used, an equal amount of common salt may be added. The following mixture of artificial fertiliser will be found to give greatly increased crops:—

2 to 3 cwt. superphosphate
1 to 1½ cwt. muriate of potash — per acre;
2 cwt. nitrolim or sulphate of ammonia

or,

2 to 3 cwt. superphosphate
1 cwt. sulphate of potash
2 cwt. common salt — per acre.
2 cwt. nitrolim or sulphate of ammonia

MARROWS, PUMPKINS, and SQUASHES.

Marrows do best on a fairly rich loamy soil, with a stiff subsoil, and many of our scrub soils are particularly suitable for these vegetables. With the aid of artificial fertilisers they may be grown on lighter soil, in which case the amount of artificial fertiliser may be increased up to 8 and 10 cwt. per acre or 8 to 10 lb. to every 43 square yards.

The following mixed fertiliser will be found suitable:—

3 to 4 cwt. superphosphate
1½ cwt. sulphate of potash — per acre.
1½ to 2 cwt. nitrolim or sulphate of ammonia

OATS.

This cereal may be grown on almost any class of soil, but requires a fairly cool and moist climate.

When grown on a soil of average quality apply per acre from 3 to 5 cwt. of a mixed fertiliser containing from 6 to 8 per cent. water-soluble phosphoric acid, 8 per cent. of potash, and 4 to 5 per cent. nitrogen, or the following mixture:—

1½ to 3 cwt. superphosphate
½ to 1 cwt. sulphate of potash — per acre.
½ to 1 cwt. nitrolim or sulphate of ammonia

LAYING OF WHEAT.

By BENJAMIN WILSON.

Some farmers, in their eagerness to obtain as big a wheat crop as possible, plant their seeds as close as they possibly can; with the result that light cannot pass between the plants and the stems become long and slender. The stems are thus no longer able to support the weight of the ears of corn and "laying" results. For the healthy growth of wheat a certain intensity of light is essential. The light acts directly on the protoplasm and gives to it some of the energy it utilises in constructive metabolism; thus it exerts a tonic influence on

the development of the cornstalk. Without entering into detailed botanical explanations, it may be said that while light is not absolutely essential for growth it is still necessary for healthy growth. Plants will grow faster in the dark than in the light, as may be seen in rhubarb, which when forced in the dark has small leaves and long slender stems. When grown in the light, the stem of rhubarb is short and thick. Speaking generally, it may be said that most plants grown in the dark have soft stems, which are very much elongated and sickly in colour.

Plants grow more rapidly during the night than during the day. During daylight food formation takes place, and the materials then stored are used up during darkness in producing the permanent change in the plant. From what has been said it will be seen that the remedy for laying of wheat is to widen the distance between each seed. The trouble will then be averted.

STOCK FOODS.

By J. C. BRÜNNICH, Agricultural Chemist.

The dairy farmers of this State have again passed, on account of scarcity and high cost of feed, through an exceedingly trying time, and in a very large number of cases hand feeding had to be resorted to. At such times it is of utmost importance to have some knowledge of the composition of various fodders, and more particularly of the more common commercial concentrated foodstuffs, which will have to be used in connection with poorer foods to keep the stock in good condition. The monetary value of such foods can only be judged by comparing their composition.

A very large number of various grasses, cereals, leguminous crops, grains and seeds, and root crops, have been analysed at our agricultural laboratory from time to time, and the results published in our annual reports. As these reports are not always to hand, I have had prepared a short table of the analysis and composition of the most common stock foods, which appeared in article under the same heading in the "Agricultural Journal" two years ago. Since that time a large number of various grasses, and of common pasture, at different periods of growth, have been analysed, and the variation in composition was found to be very striking,* so that it was considered of more value to average the results of all the analyses in the preparation of the new table.

In the table (Table II.) at the end of this paper the amounts of constituents most important for nutrition contained in every 100 lb.

* Annual Report of Agricultural Chemist, 1914.

of fodder are given under the headings: **Crude Protein, Carbohydrates, Crude Fibre, Crude Fat,** and **Crude Ash.** Only parts of these constituents become really **available** to the animal by being more or less digestible. Again, we must bear in mind that the various classes of farm stock, and even individual animals of each class, have a greatly varying power of digestion. All ruminants—animals like oxen, cows, sheep, and goats, which chew their cud—digest much larger proportion of the nutriment constituents of foods than non-ruminant animals, like horses, pigs, &c. This variation in digestibility applies more particularly to the coarse and bulky fodders, straws and hay, of which a horse digests much less than a cow or sheep.

Unfortunately, no actual feeding experiments on the digestibility of our stock foods have been carried out in Queensland, and all our calculations of the digestible portions of such foods have to be based on European and American experiments. The **values of digestible** constituents, contained in every 100 lb. of fodder, are calculated (in Table II.) on the average digestion of ruminants, and apply therefore chiefly to the feeding of cows, sheep, &c. The values would be lower when the fodders are used for the feeding of horses and pigs.

When calculating actual rations the values of digestible nutrients have again to be modified, as in all cases a certain amount of energy is required for mastication and digestion itself, and the "**availability**" of a food for actual productive purposes will in many cases be very considerably lowered. Of the digestible nutrients in the more easily digested fodders, like roots, grain, meals, &c., as much as 95 per cent. may be available, but in the case of rough fibrous foods, straw, poor coarse hay, &c., only 30 per cent., or about one-third, of the food is actually made use of, two-thirds of the energy being wasted for mastication and digestion. A liberal extra allowance has therefore to be made when using coarser fodders in the making up of rations. As a matter of fact, when feeding horses with coarse fodder like straw or poor quality of hay, so much energy is consumed in digestion that nothing is left to enable the animal to perform any work.

The nitrogenous compounds, included under the heading "**Crude Proteins,**" are called the **flesh-forming constituents** of food, as their chief function is the production of blood, muscle, and repair of waste tissue. The **nitrogen-free compounds** come under the headings: Carbohydrates (starch and sugars), crude fibre, and crude fat, which all are **heat** or **energy producers,** and may also form fat.

Every efficient food ration must contain a minimum amount of proteins and a certain amount of total heat or energy producing con-

stituents, and in order to avoid waste of one or the other, a certain ratio, called the **nutritive ratio,** between the amounts of digestible proteins and digestible non-nitrogenous (energy producing) nutrients has to exist in a properly balanced ration. This ratio must be changed in accordance with age and the amount of work to be performed by the animal.

When judging the value of fodder as food for stock we have to consider besides the practical points of succulence, flavour, and palatability, the chemical composition with regard to the amounts of: 1st, nitrogenous constituents; 2nd, heat or energy producing nutrients; 3rd, mineral matter; and, lastly, of water.

The amount of **water,** or rather the ratio between water and total dry food material, is of some importance, cattle requiring a ratio of about 4 to 1, sheep only 2.1, whilst horses, according if they are at rest or working, require ratios of 2.1 to 3.6 to 1. When feeding cattle with dry rations larger amounts of water are required; as soon as roots are fed, the quantity of water required is much less, and when feeding very succulent watery foods, as, for instance, prickly-pear leaves, no water at all need be supplied; in fact, giving water to cattle so fed may be even dangerous.

The **energy value** of a fodder may be measured by the amount of heat evolved on burning, and may also be called **fuel value.** For the calculation of this value, starch is taken as the unit, the other carbohydrates, sugars and fibre, are taken of the same heat value, fat produces 2.3 times the amount of heat, and protein only about $\frac{9}{10}$ the amount. The total amount of energy produced by all the digestible nutrients of a food is also expressed as its **starch value (equivalent)**, and may be used for comparison of the feeding value of the various fodders.

The old feeding standards of *von Wolff* have been slightly modified on the results of more recent feeding experiments carried out by *Professor Kellner,* of the Möckern Experiment Station in Germany, and he applies in his feeding standard principally the starch equivalent of foods for the making up of suitable rations. Carefully conducted trials carried out in Denmark and Sweden, which were made more particularly to ascertain the milk production from certain rations, gave results closely approximating the values based on Kellner's starch equivalents.

In the following short table the actual net available amounts of energy produced by food is taken into account, and all compared with wheat taken as the unit.

Equivalent Quantities of Food.

—	Based on Kellner's Starch Equivalent.	Danish Scale.	Swedish Scale.	Lawe's and Gilbert's Scale.
Wheat	1	1	1	1
Bran	1·5	1	1·1	1·25
Oil Cake	·9 to 1·1	1	·85 to 1	·9 to 1·1
Clover Hay	2·2	2	2·5	2
Meadow Hay	2·3	2·5	2·6	2·1
Mangolds	11	10	10	13
Turnips	15	12	12·5	19
Straw	4·2	4	4	2·5
Green Fodder	7 to 9	10	7·5 to 11	..
Potatoes	3·8	4	5	8·5

In order to compare this table with the values given in my larger table at the end of this paper, in which the starch equivalent of wheat is taken as 16, meaning that it takes 16 lb. of wheat to supply a cow of 950 to 1,000 lb. live weight with sufficient amount of energy-yielding nutrients for the production of 25 lb. of milk daily, we find, for instance, straws to have a starch equivalent from 23 to 28 lb., thus requiring theoretically from 1½ to 2 times the weight, as compared with weight of wheat, to supply the necessary amount of carbohydrates or fuel value.

As already stated, a large amount of energy is wasted in the mastication and digestion of straw, and therefore according to Kellner's and other practical tests, straw must be actually fed about 4 times the amount of wheat to produce the same energy. In the case of more digestible foods the difference between our theoretical starch values and Kellner's available starch equivalent will seem much smaller, and we find, for instance, that they practically agree in the case of bran, oilcakes, and potatoes.

For the actual calculation of rations for farm stock we must now take Table I. of "Kellner's Standard Rations," which we find gives values slightly lower than those given in von Wolff's table previously published. Again, in the case of two values being given we may safely assume that with our more favourable climatic conditions the lower value will suffice for the rations of our stock.

TABLE I.

Kellner's Standard Rations.

PER 1,000 LB. LIVE WEIGHT PER DAY.

Animal.	Dry Matter in Total Ration.	Digestible.	
		Protein.	Starch Equivalent.
Horse (light work)	18-23	1·0	9·2
Horse (medium work)	21-26	1·4	11·6
Horse (heavy work)	23-28	2·0	15·0
Fattening Cattle—			
At 550 lb. live weight	26	2·8	14·4
At 770 lb. " "	26	2·2	11·2
At 950 lb. " "	26	1·5	10·0
Milch Cattle—			
Yielding 10 lb. milk	22-27	1·1·3	7·8-8·3
Yielding 20 lb. "	25-29	1·6-1·9	9·8-11·2
Yielding 30 lb. "	27-33	2·2-2·5	11·8-13·9
Yielding 40 lb. "	27-34	2·8-3·2	13·9-16·6
Fattening Lambs—			
65 lb. live weight	31	3·5	17
110 lb. " "	28	2·5	15
Full grown	24-32	1·6	14·5
Fattening Pigs—			
44 lb. live weight	44	6·2	33·8
110 lb. " "	36	4·5	32·0
200 lb. " "	28	3·0	24·5

In this table all rations are calculated as required per day and per 1,000 lb. live weight. From the table we see that a horse heavily worked requires double the amount of proteins than a horse with light work. When fattening cattle or pigs, the amount of protein in the ration is reduced as the animals increase in weight. The quantities of digestible nutrients necessary for the calculation of rations may all be taken from Table II.

In order to make comparison easier the last two columns of Table II. give the **starch** and **protein equivalents** of each fodder expressed as the quantity of food in lb. required to be fed daily to a cow from 750 to 900 lb. live weight yielding about 25 lb. of milk and requiring about 26 lb. dry material, containing 1·9 lb. protein and 11 lb. starch value. Nearly the same amounts of food would be required by a horse fairly heavily worked. In all cases where the amounts of starch and protein equivalents are about the same, we know that the fodder is a well-balanced ration. We find that 16 lb. of wheat would supply the necessary amount of protein and starch, but the total weight of dry matter, of which a cow requires about 26 lb., would not be sufficient.

Of Couch grass and Prairie grass, some of the most ideal feeds for dairy cattle, about ¾ cwt. are required to supply the necessary protein and starch.

If we look at lucerne hay we find that about 24 lb. are required to supply the necessary amount of energy, but that only 17 lb. are required to supply the necessary protein, because lucerne hay has a nutritive ratio of 1 to 3·3, which indicates that it contains too much nitrogenous nutrient material as compared to carbohydrates, whereas a cow requires a ratio of about 1 part of digestible proteids to 5·4 parts of digestible carbohydrates, including fat.

When feeding, therefore, cows entirely on lucerne hay, we supply more nitrogenous material than necessary, which consequently goes to waste. It is therefore an advantage to feed a small quantity of lucerne hay and supplement the feed with fodders containing a comparatively higher amount of carbohydrates and fats, or of a wider nutritive ratio, like wheat straw, bush hay, potatoes, &c.

When using fodders like prickly-pear leaves, rather poor in nitrogenous nutrients, the fodder must be supplemented with concentrated foods rich in nitrogenous constituents like cotton-seed meal, linseed meal, or oilcake.

A cow could consume, say, 60 lb. of prepared prickly-pear leaves per day and gets therefore $\frac{6}{10}$ of .3, or about .2 lb., of digestible protein and $\frac{6}{10}$ of 6, or 3·6 lb., of starch. To supplement the ration we give in addition 25 lb. bush hay, and supply therefore ¼ of 3.2, or ·8 lb., protein, and ¼ of 56.6, or 14.2 lb., starch. The cow will get a total of 1 lb. of protein and 17·8 of starch, or only about half the amount of nitrogen required. In order, therefore, to make a complete ration we must add 2½ lb. cotton-seed meal, or 3 lb. linseed meal, or 6 lb. of oilcake to supply the deficiency of ·9 lb. of protein.

Any other ration can be calculated in a similar manner.

Table II.

COMPOSITION OF FODDERS.

Giving pounds of food materials, and of water, and of digestible nutrients contained in every 100 lb. of fodder.
Pounds of each fodder required to supply a cow of 750 lb. to 900 live weight, yielding 25 lb. milk daily, with 11 lb. starch value, and 1·9 lb. protein.

—	Water.	Crude Protein.	Carbohydrates.	Crude Fibre.	Crude Fat.	Crude Ash.	Digestible Nutrients. True Protein.	Carbohydrates.	Fibre.	Fat.	Nutritive Ratio (1 +)	Starch Value.	Lbs. of Fodder to Give. Starch Equivalent to 11 lb. Starch.	Protein Equivalent to 1·9 lb. Protein.
Green Fodders—														
Grasses and Cereals—														
Barley	79·0	2·7	8·0	7·9	·6	1·8	1·4	5·7	4·8	·4	8·1	12·8	86	136
Buffalo grass	78·0	2·1	12·3	4·6	·5	2·5	1·2	9·0	2·9	·4	10·7	13·9	79	158
Couch grass	74·1	4·1	10·0	8·4	·4	3·0	2·4	7·3	5·3	·3	5·5	15·5	71	79
Grass, mixed pasture	62·1	2·4	14·8	15·6	·6	4·5	1·3	10·8	9·8	·45	16·7	22·9	48	146
Maize	70·9	2·6	13·4	9·6	·5	3·0	1·2	9·8	6·4	·4	14·3	18·2	60	158
Indian cane	77·0	1·5	11·0	8·9	·2	1·4	1·7	7·9	6·0	·2	20·5	15·0	73	272
Oats (in green head)	79·0	1·8	11·9	5·1	·5	1·7	1·0	7·5	3·6	·4	12·0	12·9	85	190
Paspalum	74·7	2·3	9·9	10·2	·5	2·4	1·3	7·2	6·4	·4	11·3	15·7	70	146
Prairie grass	76·8	4·3	8·3	7·2	·8	2·6	2·1	6·1	4·5	·6	5·7	13·9	79	90
Rhodes grass	70·3	2·2	11·8	12·2	·5	3·0	1·0	8·6	7·7	·4	17·2	18·1	61	190
Sorghum	70·6	2·1	15·1	9·1	·6	2·5	·8	11·3	5·4	·5	22·3	18·6	59	238
Summer grass	72·0	1·4	13·1	10·0	·3	3·2	·6	9·6	6·3	·2	27·2	16·9	65	317
Sugar-cane tops	72·7	2·4	12·3	10·0	·8	1·8	1·1	8·9	6·7	·6	15·4	18·0	61	173
Legumes—														
Cowpea vines	79·1	3·3	8·3	5·5	·9	2·9	1·9	6·2	2·9	·5	5·4	12·0	92	100
Lucerne	76·0	5·4	8·3	6·8	·7	2·8	3·0	6·1	3·4	·3	3·4	12·9	85	63
Various—														
Prickly-pear (leaves)	89·7	·5	7·0	1·1	·1	1·6	·3	4·8	·7	·1	19·8	6·0	183	634
Saltbush	67·8	5·0	14·8	6·6	·7	5·1	2·6	10·1	4·1	·5	5·9	17·7	62	73
Sheeps Burnett	76·3	4·4	9·0	6·2	·7	3·4	2·5	6·1	3·8	·5	4·8	13·1	84	83
Sweet potato vine	85·6	2·0	6·3	2·8	·7	2·6	1·3	4·3	1·7	·5	5·5	8·3	133	146
Silage—														
Maize	69·1	1·9	11·6	9·2	·5	2·7	1·0	7·8	6·5	·4	15·2	16·1	68	190
Sorghum	74·3	1·8	14·4	8·9	·4	2·2	·9	9·6	6·3	·3	18·4	17·4	53	211
Wheat, thistles and mustard	65·0	4·6	13·5	11·9	1·2	3·8	1·9	9·0	8·4	·9	10·2	21·2	52	100

Roots, Tubers &c.—														
Beets	77·0	2·1	17·0	1·8	·1	2·0	·5	16·8	1·6	·1	37·2	19·1	58	380
Cabbages	90·5	2·4	3·8	1·5	·4	1·4	1·2	3·4	1·4	·4	4·8	6·8	162	158
Mangolds	87·5	1·6	7·1	1·4	·1	2·3	·6	6·5	·7	·1	12·4	8·0	138	317
Potatoes	75·5	2·1	20·2	·7	·2	1·3	·8	19·8	·4	·2	25·8	21·4	51	238
Ditto, sweet	71·1	1·5	24·7	1·3	·4	1·0	·6	24·2	·7	·3	42·6	26·1	42	317
Pumpkins	83·9	2·2	8·3	3·1	·9	1·6	1·1	7·0	2·6	·7	10·2	12·2	90	173
Swedes	86·0	2·0	9·4	1·3	·1	1·2	·4	8·9	1·2	·1	25·8	10·7	103	475
Turnips	89·5	2·7	5·2	1·4	·1	1·1	·6	4·9	1·3	·1	10·7	7·0	157	317
***Dry Fodders*—**														
Hay and Straw—														
Barley	9·5	10·4	37·2	31·8	2·2	8·9	4·5	23·8	19·1	1·2	10·1	49·7	22	42
Bush hay, good	7·5	6·1	38·6	39·8	1·9	6·1	3·2	26·2	25·0	1·1	16·8	56·6	19	59
Ditto, poor	6·5	2·8	36·6	45·3	1·1	7·3	1·3	23·4	27·2	·6	40·0	53·2	21	146
Canary grass	9·0	15·2	40·2	26·0	2·1	7·5	6·1	25·7	15·6	1·1	7·2	49·3	22	31
Cowpea chaff	8·1	15·7	31·5	26·6	4·3	13·8	8·1	22·3	11·2	2·2	4·8	45·8	24	23
Lucerne	8·2	21·0	31·4	25·9	2·8	10·7	11·1	21·7	11·9	1·4	3·3	46·7	24	17
Prairie grass	9·0	16·9	32·6	28·2	3·0	10·3	6·9	20·8	16·9	1·7	6·0	47·8	23	28
Straw, barley	8·5	2·9	40·2	41·0	·8	6·6	·6	21·7	22·5	·3	74·8	45·4	24	317
Ditto, Oats	9·2	4·0	42·4	37·0	2·3	5·1	1·0	22·5	21·4	·9	46·0	46·9	23	190
Ditto, Wheat	7·6	2·5	42·2	39·3	·9	7·5	·5	16·4	21·6	·3	77·3	39·1	28	380
Wheat hay	8·3	10·7	33·6	37·6	2·0	7·8	4·2	21·5	22·6	1·1	11·1	50·4	22	45
Grains, Seeds, &c.—														
Barley	10·9	12·4	69·8	2·7	1·8	2·4	8·7	64·2	·7	1·2	7·8	75·5	15	22
Corn (maize)	12·0	13·1	65·8	2·0	5·5	1·6	10·0	61·2	1·2	4·7	7·3	82·2	13	19
Cowpeas	14·8	20·8	55·7	4·1	1·4	3·2	17·3	52·0	1·1	·8	3·2	70·5	16	11
Kaffir corn	9·3	9·9	74·9	1·4	3·0	1·5	7·5	69·6	·8	2·6	10·1	83·1	13	25
Linseed	9·2	22·6	23·1	7·1	33·7	4·3	17·0	12·7	4·3	29·0	4·9	99·0	11	11
Oats	11·0	11·8	59·7	9·5	5·0	3·0	9·2	46·0	2·5	4·1	6·3	66·2	17	21
Rice	12·4	7·4	79·2	·2	·4	·4	4·6	73·1	·1	·4	16·1	78·3	14	41
Sunflower seeds	8·6	16·3	21·4	29·9	21·2	2·6	14·3	16·5	17·0	18·7	5·3	89·4	12	13
Wheat, plump	11·1	14·8	67·4	3·2	2·2	1·3	11·8	54·0	1·1	1·5	5·0	69·2	16	16
Ditto, shrunk	8·3	17·1	65·8	3·5	3·0	2·3	13·7	52·6	1·2	2·0	4·3	70·7	16	14
By-Products—														
Barley and malt combings	15·1	11·2	64·0	5·3	·5	3·9	8·3	44·3	1·8	·5	5·6	54·7	20	23
Bran	11·9	15·4	53·9	9·0	4·0	5·8	11·0	34·5	1·6	1·8	3·6	50·1	22	17
Brewers' grain, wet	75·7	5·4	12·5	3·8	1·6	1·0	3·9	7·7	1·5	1·4	3·2	15·9	69	49
Corn cobs	8·4	2·5	54·7	32·0	·7	1·7	·5	26·3	18·3	·6	92·0	46·4	24	380
Cotton seed meal	9·9	47·3	22·5	3·2	12·2	4·9	39·0	13·5	1·8	11·3	1·0	76·4	14	5
Linseed meal	10·0	36·1	36·7	8·4	3·6	5·2	30·0	28·2	4·8	3·2	1·4	67·4	16	6
Oilcake, sunlight	9·5	19·2	47·4	7·0	11·2	5·7	15·6	38·6	4·0	10·4	4·3	80·6	14	12
Peanut meal	10·7	47·6	23·7	5·1	8·0	4·9	33·8	11·6	·6	7·2	·9	59·2	19	6
Pollard	10·0	17·4	58·0	5·2	5·6	3·8	13·9	47·0	1·7	4·8	4·3	72·2	15	14
***Various Foods*—**														
Milk	87·2	3·6	4·8	..	3·7	·7	3·4	4·7	..	3·7	3·9	16·3	68	56
Ditto, skimmed	90·4	3·8	5·0	..	·1	·7	3·6	5·2	..	·1	1·5	8·7	126	53
Dried blood	8·5	84·4	..	..	2·5	4·6	52·4	..	..	2·5	·1	52·0	21	36
Molasses	24·0	2·2	63·8	..	..	10·0	..	57·5	..	..	..	58·5	19	..

DEPARTMENT OF AGRICULTURE AND STOCK.

CORN-GROWING COMPETITION, 1915-16.

1. This competition will be open to all under the age of eighteen years who are residents of the State of Queensland. An entrance fee of 2s. 6d. must be forwarded to the Under Secretary with the application to enter.

2. Applications to be enrolled in the competition, containing the following particulars, must reach the Under Secretary, Department of Agriculture and Stock, Brisbane, not later than 12 noon on the 30th September, 1915:—

(*a*) Full name and address. (Give Christian names in full.)
(*b*) Date of birth. (Day, month, and year.)
(*c*) No. of Division in which applicant resides, and the name of the Dairy Inspector who supervises the locality.

3. The area to be devoted to the planting of the seed maize shall be one-tenth of an acre, selected seed for which will be supplied free of cost; but one parcel only will be supplied to each competitor during the period of the competition.

4. Each competitor shall have absolute freedom in his choice of ground, and in the methods he may adopt in preparing, planting, and cultivating his plot; but in no case shall a plot exceed one-tenth of an acre, otherwise disqualification will be incurred.

The following table shows the length the rows must be to give the exact area according as four, five, six, or more rows are planted:—

No. of Rows 4 feet apart.	Length of Rows in Feet.	No. of Rows 4 ft. apart.	Length of Rows in Feet.
4	272 ft. 3 ins.	8	136 ft. 1½ ins.
5	217 ft. 10 ins.	12	90 ft. 9 ins.
6	181 ft. 6 ins.	16	68 ft.
7	155 ft. 7 ins.		

5. Each competitor will be required to keep a record chart showing the dates and particulars of the different stages of work, and these charts are to be delivered, at the time of harvesting, to the officer appointed for superintending and verifying the yield.

6. Within seven days from the verification of the yield from the crop, each competitor shall select, without aid from other persons, twelve cobs of the maize from his crop, and forward them to the Department of Agriculture and Stock, Brisbane. Labels for this purpose will be supplied.

7. Competitors must notify the Dairy Inspector for the district of the date when the crop shall have matured and be ready for inspection.

8. No competitor shall be allowed to employ or permit any labour upon the competition plot standing in his name, other than his own personal labour, excepting in relation to the driving of horses, for which, owing to circumstances, such help may be needed.

9. The competition will close on the 30th June, 1916, and the prizes will be allotted thus:—

The competitors will be grouped according to the following divisions:—

(1) The district supervised by—

Mr. S. A. Clayton, Dairy Inspector, Beenleigh.
Mr. H. C. Gordon, Dairy Inspector, Harrisville.
Mr. D. J. Binnie, Dairy Inspector, Rosewood.

(2) The district supervised by—

Mr. C. C. Pickering, Dairy Inspector, care of Mr. D. Macpherson, Montague road, South Brisbane.
Mr. R. G. Ridgway, Dairy Inspector, Ellerslie Crescent, Taringa, Brisbane.
Mr. R. Winks, Dairy Inspector, Gympie.
Mr. F. J. Watson, Dairy Inspector, Bundaberg.
Mr. W. S. Harding, Dairy Inspector, Esk.

(3) The district supervised by—

Mr. J. H. Barber, Dairy Inspector, Crow's Nest.
Mr. J. P. Carey, Dairy Inspector, Gatton.

(4) The district supervised by Mr. W. Hartley, Dairy Inspector, Nanango.

(5) The district supervised by—

Mr. J. J. Carew, Dairy Inspector, Russell street, Toowoomba.
Mr. L. Verney, Dairy Inspector, Newtown, Toowoomba.
Mr. J. R. D. Munro, Dairy Inspector, Warwick.

(6) The district supervised by Mr. C. Queale, Dairy Inspector, Gayndah.

(7) The district supervised by—

Mr. J. Cattanach, Dairy Inspector, Dalby.
Mr. R. S. Sigley, Dairy Inspector, Roma.
Mr. W. R. Holmes, Dairy Inspector, Goondiwindi.

(8) The Central district of Queensland, including that supervised by Mr. H. T. Deighton, Dairy Inspector, Rockhampton.

(9) The Northern district of Queensland, including that supervised by—

Mr. E. C. Lake, Dairy Inspector, Mackay.

Mr. H. C. Colledge, Dairy Inspector, Atherton.

If there are more than ten competitors in any division, three prizes will be awarded for competition in that division; less than ten competitors, one prize only.

The prizes shall be of the following value:—First, £5; second, £2; third, £1.

No money prizes will be given, but each successful competitor will be allowed to select some article to the value of his prize.

The prizes awarded in any division may be increased in number and value by donations from persons, firms, or societies who may be interested in the competition.

10. Three special prizes of the value of £10, £5, and £3 will be awarded to the competitors who stand first, second, and third in the entire competition.

These prizes may be increased in number and value in the same way as indicated above in connection with the divisional competitions.

No prize will be awarded unless the yield of corn equals 20 bushels per acre. This stipulation may be waived under very exceptional circumstances in the case of a lower yield.

11. The aggregate points will be 100, and the judging will be based upon the following:—

(*a*) Quality of the maize produced.

(*b*) Yield of plot.

(*c*) Notes and records of plot.

12. The Director of Agriculture will be the sole judge of the competition, and his decision shall be final.

WILLIAM LENNON,

Secretary for Agriculture and Stock.

Brisbane, 30th July, 1915.

EXHIBITION NOTES, 1915.

DISTRICT EXHIBITS.

The Council of the National Association must be heartily congratulated on the gratifying results which have attended the Exhibition at Bowen Park in August, 1915, notwithstanding the great handicap of the breaking out of the European war, with its heavy calls, not only on the purses of the public throughout the State, but on some thousands of the flower of the young men of the towns and of the country districts, who in past years of peace have flocked every year to the metropolis to enjoy a week's holiday and, incidentally, to expend large sums in various ways during the national carnival. These patriotic men, as well as women, who have nobly gone to the front, will have doubtless been recalling memories of their enjoyment of the Exhibitions of previous years, whilst patriotically and cheerfully undergoing the dangers and privations to which they, to their eternal honour, have subjected themselves.

The severe drought conditions which prevailed for months prior to the Show date also contributed to the difficulties so ably overcome by the Association.

The value of the work of the Association consists not merely in the amount of money taken at the gates and otherwise, but in its effects in bringing together people from all parts of the Commonwealth, as well as many from oversea, thus advertising far and wide the great resources of this most resourceful of all the States of Australasia. The general public is naturally unaware of the great volume of business transacted during and after the Show, as a direct consequence of the advantages offered to business men, and to buyers and sellers generally, by personal inspection of the exhibits and personal communication with agents. Thus, as an advertising medium, irrespective of its value from an educative point of view, the National Association's Exhibition is of primary importance, and fulfils a purpose which it would be impossible to attain in any other way. Space will not admit of our giving a comprehensive description of the multifarious exhibits in this Journal. This we leave to the enterprise of the metropolitan and country journals, confining ourselves to special salient points in connection with them.

During the past year the Association had to deplore the demise of the late Secretary, Mr. Arvier, to whose energy and enthusiasm was due the success attending many previous Shows. His successor, Mr. J. Bain, has already given evidence of good organising ability, and his energy will doubtless be instrumental in building further success on the solid foundation laid by his predecessor. The position of Secretary to an important Association such as this one demands much tact and firmness, at Show time especially, when one has to remember the quotation

so very appropriate to the occasion—"*Tot homines, quot sententiæ,*" which, being interpreted, implies that where there are many gathered together, there will be as many different opinions.

In connection with the exhibits, those coming under the head of "District Exhibits" deserve special mention. Of late years they have formed a very distinctive feature of the annual Exhibition, and are especially valuable in educating the people in respect of the various products and industries of Northern, Southern, Central, and Western Queensland, of the tablelands and plains and coastal areas, which embrace tropical, sub-tropical, and temperate districts of a State covering an area of nearly 700,000 square miles. It is owing to the vast distances which separate these from each other, that little would be known of the products and possibilities of particular districts, were it not for the bringing together of these districts by means of the National Association's Exhibitions.

The very attractive District Exhibits, therefore, deserve special mention, forming, as they do, a distinctive feature of the Exhibition, as before stated. In times past, the Moreton District exhibit has been very successful in taking first place amongst these important exhibits. It was in 1906 that Moreton and Wide Bay and Burnett tied, and Moreton won the Chelmsford Shield in the following year. The latter district was also successful at the Bowen Park Shows of 1903, 1904, 1905, tying with Wide Bay and Burnett in 1906.

In 1907, Moreton decided to rest on its laurels and stand out in 1908. This was much to be deplored, although it was certainly magnanimous of the Moreton men. Still, it was considered that every district throughout the State should put forth its best endeavour to show what its resources are, and, win or lose, there will always be the satisfactory consciousness of having done something for the dissemination of a knowledge, or a dissipation of the crass ignorance existing in some quarters of the grand resources of this "Queenly State."

In 1908, other districts determined to wrest the laurels from the men of Moreton, and they gradually crept up, and the Central District was successful in that year.

In 1909 the honours went to Wide Bay and Burnett.

In 1910 a new departure was made by the Council of the Association, no general districts, as a whole, being represented, but their place was taken by what was termed "One Farm Exhibits." Probably more interest was taken in these than in the former classes. The object was to show what could be done by individual farmers. No district was ransacked to obtain every conceivable product, from a pincushion to a pumpkin, from a horseshoe to an engine, but everything shown was absolutely produced on the competing farms by the farmer and his family.

The result of this decision fully justified the new departure, and seven entries represented the first struggle. Under the caption "One Farm Exhibit," we have given all the information on these, as well as

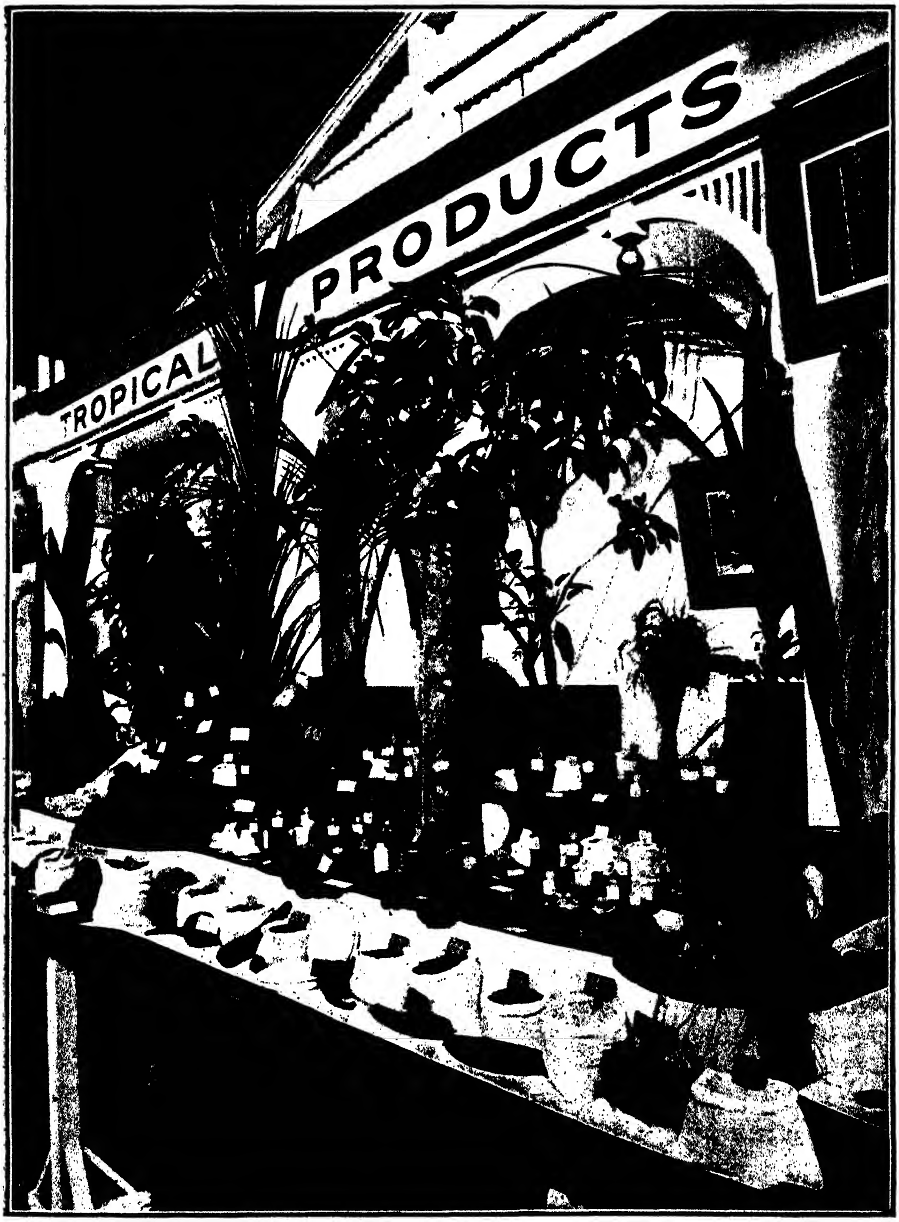


PLATE 6.—DISPLAY OF TROPICAL PRODUCTS, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

we know, up to the present date. It will be interesting to recall the words of the Hon. W. Kidston, then Premier of Queensland, on the subject of "District Exhibits," at the luncheon on the opening day of the Exhibition of 1906. He said, *inter alia*:—"The thing that struck him most about the annual Exhibition was its truly national character. The district exhibits were an admirable feature of the Show, and the competition was excellent from a national point of view. A personal patriotism was shown in the exhibit of articles for the sake of the district. It was an exceedingly healthy and profitable spirit to inculcate. . . . They needed to educate their own people in the possibilities of their own country, and if they could develop the district competition sufficiently, they might be able, not only to educate their own people, but to get together products from all parts of Queensland which would be worth sending to the old country. He was certain that, if the display was really worthy of the industries and production of Queensland, it would not only open the eyes of many Queenslanders, but would open the eyes of the people in the old country as to the value and possibilities of Queensland." This was putting all we have said and written in the past on the subject in a nutshell, tersely, and to the point, and verily the honourable gentleman unconsciously spoke prophetically, seeing that what he suggested as a possibility has become a reality, Queensland's products and industries having long since been exhibited in the old country, on the Continent of Europe, and now in San Francisco.

This year the Northern Rivers of New South Wales, the Western districts, and the Thera district of the same State were grouped under the title of

THE "A" GRADE.

WESTERN DISTRICTS (N.S.W.).

Last year the Western districts competed in this section, and the extent of the exhibits may be accounted for by the fact that the district comprises such centres as Bathurst, Dubbo, Mudgee, Orange, Lithgow, Wellington, and Blaney. The exhibits comprise 100 fleeces of wool both of the pure merino and its crossbreeds. As might be expected, wheat figures largely, as do hay and chaff, maize, grasses, tobacco, whilst it would seem impossible to present more magnificent apples, pears, peaches, and oranges than those grown at Dubbo. Marble from the Bathurst quarries (much used throughout the Commonwealth) attracted considerable attention. Dairy products were also in evidence, especially Cheddar cheese made at the Byalong Cheese Factory.

NORTHERN RIVERS (N.S.W.).

The Northern Rivers of New South Wales and their products are better known to Queenslanders than the Western districts of that State, owing to their proximity to the Southern districts of Queensland, and to the fact that it has long been acknowledged that Brisbane is the natural outlet for the products of those fertile districts and that only the construction of a short line of railway is needed to connect them with the Southern Queensland railway system. Most of the exhibits came from

the Tweed, Richmond, and Clarence Rivers, and the display was arranged by the North Coast Agricultural Shows' Association. Byron Bay and Ramornie were well to the front with dairy produce, swine products, and canned meats. Farm products, honey, jams, pickles, &c., were all largely represented and excellent of their kind. Sugar-cane, being grown to some considerable extent on the Tweed River, was well to the fore, and citrus and many tropical fruits were largely in evidence, proving that the climate and soil of the Rivers are much akin to those of Southern Queensland.

SOUTH COAST, QUEENSLAND.

It was gratifying, of course, to Queenslanders that the South Coast exhibit succeeded in carrying off the first prize in the "A" Grade. Six years have elapsed since the district, under the name of the Logan, appeared as a competitor at the Bowen Park Show. To-day the South Coast includes in its extensive area some of the finest agricultural, dairying, and fruit-growing soils in the State, nearly all of which had large areas under sugar-cane in the old days of sugar-growing in the State. These are Cleveland, Redland Bay, Ormiston, Beenleigh, Coomera, Nerang, Pimpama (Ormeau), and Yatala. Other non-sugar districts were Manly, Springbrook, Tabragalba, Beaudesert, &c. The exhibits comprised many varieties of sugar-cane, sugar raw and refined, cereals, potatoes, root crops, hay, grasses, fruits, and a vast variety of timber, besides multifarious products of the farm, women's industries, &c. Dairy products, hams, bacon, &c., were well to the fore. The exhibits were displayed to the greatest advantage.

"B" GRADE.

GYMPIE.

The Gympie exhibit was an "eye-opener" to many whose only idea of Gympie has hitherto been that the district is only devoted to gold-mining. Included therein is part of the celebrated Blackall Range, now so well-known for its magnificent scrub soils, hundreds of acres of which have long since been producing fortune-making crops of citrus fruits, pineapples, bananas, &c., beside ordinary farm and dairy products, Yandina, the Maroochy, Cooroy, &c., all districts producing splendid timbers, fruits, farm and dairy produce, &c., besides sugar-cane and sugar, of all of which there were splendid samples, especially of the magnificent kauri pine of Kin Kin, Lake Cootharaba. Gold specimens there were, of course, but the products of the soil were pre-eminent. Of the prize money allotted to "B" Grade exhibitors Gympie took the largest share.

MURGON, WONDAI, AND TINGOORA.

combined to make a very excellent display of the products of the Southern Burnett District. The above three districts are on the Maryborough-Nanango line. The exhibits, tastefully arranged, comprised a great variety of farm products, such as maize, potatoes, hay and chaff of various kinds, broom millet, sugar-cane, natural and artificial grasses. From the Murgon factory came the butter, from Goomeri the cheese,

from Wondai a fine sample of joinery work. The fruit section was well represented by citrus fruits, bananas, apples, &c. This was quite a typical display of the agricultural products of the Burnett. There was a wonderful exhibit of the industry of the ladies in the shape of those comestibles of which our ancestral mothers were so proud—namely, jams, jellies, preserved fruits, pickles, cakes, and confectionery. It was stated that some 400 varieties were tabled. Then there was a quantity of various kinds of needlework, embroidery, and other delicate confections, which added greatly to the attractions of the exhibit.

LOCKYER.

The Lockyer is essentially an agricultural district, and its varied products have always been conspicuous at our annual Exhibition at Bowen Park. How the varied excellent specimens of field produce shown have been produced in the face of the exceptionally dry season is not easily explainable, but there they were, and as fine as if there had been a plentiful rainfall, or grown under irrigation. The Laidley and Gatton districts have long been famous for their heavy lucerne and potato crops, and both grasses and potatoes, as well as sweet potatoes and maize, were in perfect condition. Vegetables, especially cabbages and cauliflowers, were in profusion, and a useful exhibit was that of varieties of farm seeds. Honey appears to be a specialty of the district, and the exhibitors were in hopes of repeating their success in obtaining a special prize for this product as in 1914. The numerous butter and bacon factories in the district were well represented by their butter, cheese, hams, and bacon. Farm-made butter of excellence was also to be found in this section. There were three exhibits of what may be called neglected industries of Queensland, although all grow to perfection in the district, and would produce heavy crops. These were sisal hemp, tan barks, and cotton, and fabrics from sisal and cotton fibre were shown. Neither is silk wanting, and this is another neglected industry which does not appeal to the Queensland farmer or his family. Stone from the Helidon quarries, ready dressed for the builder, and soft woolly fleeces represented two important industries. And then came the samples of woman's deft work, in the shape of comestibles and needlework, destined to vie with the same subjects in all the other district exhibits. The Lockyer was a display worth visiting.

KINGAROY.

This exhibit, which was organised by the Agricultural, Pastoral, and Industrial Society, properly represented the resources of the South Burnett, in the same direction as did Wondai, seeing that the two districts are conterminous. Amongst the agricultural exhibits were to be seen very fine onions of several distinct varieties, including tree and pickling onions, leeks, and eschalots. There was a very fine wool trophy, and an exhibit of hides and tanned pelts. A very useful lesson was afforded by a plot set out with various grasses and samples of the soils of the district. This is of more importance than most people are aware of, seeing that frequently, when an intending selector wishes to settle in any particular district, his first inquiry is as to the nature of

the soil; and the exhibition of the soils and subsoils of the locality might often decide the inquirer as to whether such or such country would be suitable for him.

CROW'S NEST.

Crow's Nest is a very fertile district only 34 miles from Toowoomba, and is very strong in the production of cereals, potatoes, pumpkins, chaff, grasses, vegetables, timbers. The samples of these were certainly very commendable, especially those of all the best-known and most profitable varieties of maize. The same may be said of the wheat exhibits, comprising Gluyas, Bunge, and others raised from seed from the wheat experiment State Farm, Bungeworgorai, Roma. It was at Geham, on the Crow's Nest branch railway line (15 miles from Crow's Nest), that the corn grown by H. W. Abel won a £2 prize, also a special prize of £3, and N. S. Smoothy, of Pinelands, Crow's Nest, won the district prize of £5, as well as a special prize of £5, in the corn-growing competition of 1914-15, held by the Department of Agriculture and Stock, when there were sixty-two entries by Darling Downs lads. His good work yielded at the rate of 82 bushels per acre, and F. Franke, of Cawdor, on the same line, raised 76 bushels per acre, also being a prize-taker. These examples go far to show the adaptability of the Crow's Nest soil and climate for maize-growing. It should be stated that the abovenamed young farmers were aged, respectively, fourteen and fifteen years.

Lucerne, Rhodes grass, and panicum appear to thrive well in the district, and the mangolds could scarcely be beaten anywhere for size and weight of crop per acre. The timbers were shown in the rough, and in the polished and unpolished state. The dairying industry, as elsewhere on the Darling Downs, was well represented, and the exhibits were interspersed with the many varieties of preserves, and other useful and delicate articles, the work of the ladies of the households.

Mr. John Macdonald (chairman of the National Association Council) presided at the annual informal meeting of those connected with the district and one-farm displays. Messrs. John Reid, A. W. Cameron (council stewards), and J. Bain (secretary) were also present, and there was a good attendance of the workers in connection with the different exhibits.

The chairman said he was glad to once again meet the district exhibitors. The National Association duly appreciated the work done in that section of the annual Exhibition, and in every way possible endeavoured to encourage them to come each year, for the council recognised that such displays were an object lesson as to the fertility of the soil and the high quality of the primary products of the State. The work of arranging these displays, he thought, was of considerable magnitude, but he was pleased to see that progress was being shown all round. Never had there been retrogression during the twenty years the district exhibits had been displayed in the Exhibition. He thanked all for their very hard work. During the previous year the Association spent no less a sum than £2,000 on these district displays, so that the

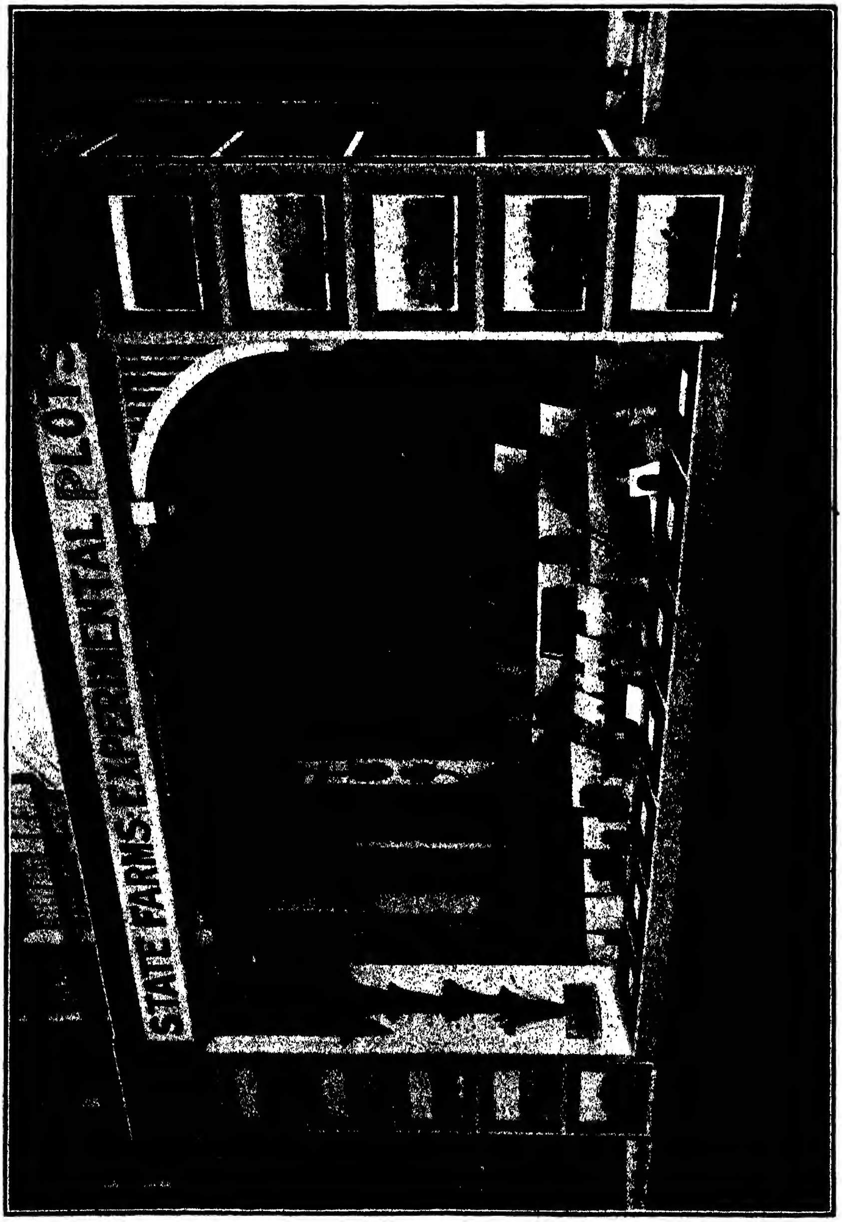


PLATE 7.—DEPARTMENTAL COURT (AGRICULTURE AND STOCK), CENTRAL DISPLAY FROM STATE FARMS AND EXPERIMENTAL PLOTS, NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

public understand that the Council was thoroughly alive to the fine advertisement Queensland secured through these collections of exhibits. Considering every aspect of the case, it was decided this year to give each of the "A" Grade districts a bonus of £20, and to increase the prize money in the "B" Grade by £50. The altered prize money was as follows:—"A" Grade: South Coast, £130; Western Districts, N.S.W., £105; Northern Rivers, N.S.W., £75. "B" Grade: Gympie, £73 18s.; Lockyer, £73; Kingaroy, £69 1s.; Wondai, Murgon, and Tingoora, £68; Crow's Nest, £66 1s. One-farm displays: O. C. Williams, £54 8s. 9d.; T. Nystrom, £45 11s. 3d. He sympathised with Mr. Trevitt, manager of the Western districts, in having met with an accident.

Mr. John Reid said the district exhibits had greatly improved during the last few years, and now they had been brought to the highest plane. He trusted that next year more "A" Grade districts would compete. The whole display had been astonishing, not only to the council but also to the public who visited the show.

Mr. A. W. Cameron said that arranging district displays had now become a science. Many small details required their consideration. They always endeavoured to secure the very best judges available for the work, but if there had been any errors of judgment it was no fault of the association. He trusted that all present would help at the next Exhibition, and encourage other districts to enter into the competition.

DEPARTMENT OF AGRICULTURE AND STOCK.

As in former years, that portion of the Exhibition building devoted to the exhibits of the Department of Agriculture was nicely arranged, and set forth to the best advantage the multifarious products of the State, which include those of the torrid, sub-tropical, and temperate zones. Even a cursory inspection of the exhibits of the different branches of the Department must convince the stranger that Queensland is a most desirable State to select for a home. In this section, as also in the District sections, may be seen practical proofs of the extraordinary resources of the country, as well in climate, rainfall, and soil, as in the vast areas of land open to selectors. All the trophies and displays here have been arranged, not only with a view to spectacular effect, but rather with the the idea of making everything in the section serve an educational and instructive purpose. The different sections and trophies, illustrating the Department's activities, were, as described in the "Brisbane Courier":—

Sheep and wool, stock experiment station, botanical division (weeds and suspected poisonous plants, and native grasses), division of entomology and vegetable pathology, pure seeds display from the seed-testing branch, combined seed-corn and corn-growing display, exhibit of saccharine and non-saccharine drought-resistant sorghums, broom millet (educational display), tropical products, tobacco (pipe, cigar, cigarette), fibres (including cotton), hay, chaffs, and fodders, vegetables (including special display of imported potatoes, grown at the Agricultural College,

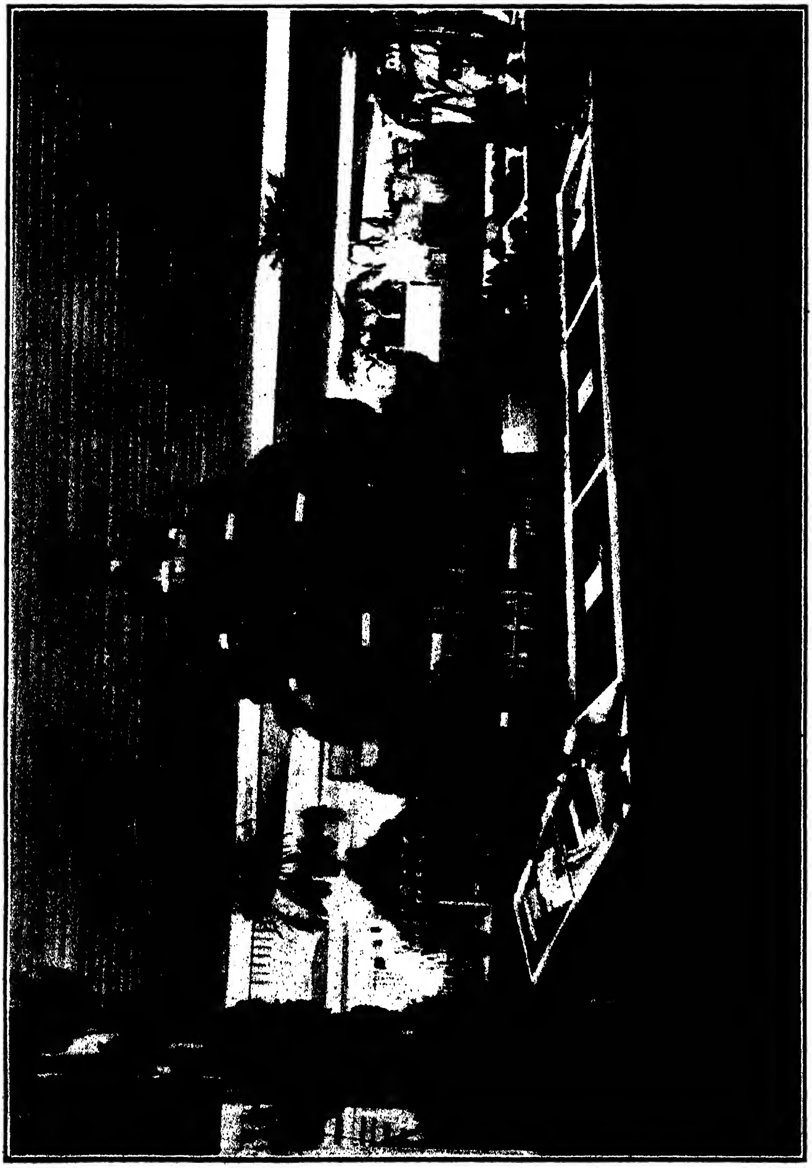


PLATE 8.—EXHIBIT OF SACCHARINE AND NON-SACCHARINE SORGHUMS (DEPARTMENTAL COURT, AGRICULTURE AND STOCK) NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

Gatton), Roma State Farm wheat and wheat-breeding display, various products from the Agricultural College, wheat, maize, sorghums, and fodders from field experiment plots, cereals and fodders from Warren and Hermitage State Farms, trophy of typical Queensland fruits (temperate and sub-tropical), Gordo Blanco raisins from Roma State Farm, farm and garden seeds, samples of seed wheat distributed to farmers under the 1915 wheat extension scheme, and photographs illustrating the State's primary industries.

The seed-testing branch exhibit includes a collection of seeds, comprising not only such well-known kinds as lucerne, prairie, oats, &c., but the samples as often sold to the seed trade, and the same after cleaning and grading preparatory to resale. All buyers of agricultural seeds are not as yet fully aware of the working of the Pure Seeds Act, and the seed-testing branch has been established so that they may guard against sowing seeds of low quality. Any purchaser may send samples to the branch to be tested for purity and germination. If a buyer insists on a low price he is practically insisting on low quality. One sample of Algerian seed oats, the sale of which was stopped by the Department, contained 46·48 per cent. of impurities (14·16 Star Thistle, 12·06 barley, 18·33 darnel or drake, 1·93 other impurities.) The cleanings from lucerne and prairie grass are object lessons as to the value of recleaned and graded samples. The samples of weed seeds—the dodder, darnel, star thistle, wild radish, and several others—were taken from the bulks of seed offered for sale. The system of testing adopted by the seed branch, after very carfeul investigation of the methods used in London, Paris, Copenhagen, Zurich, and Wageningen, may be briefly described as follows:—Purity tests: In testing for purity only foreign seeds, and foreign matter such as sand, stalks, &c., are treated as impurities. Germination tests: All seeds of the species to which the sample purports to belong are included without reference to their condition of maturity (immature seeds and seeds without kernel are retained as pure seeds). Check tests are made of every sample. The "Tissot" method, by germinating the seeds on damp flannel, and by the "Simplicitas method," germinating the seeds in sand, on porous blocks; both of these systems are demonstrated in the exhibit.

Soil Exhibit.—Soils from some of the most important and characteristic farming districts of the State were collected, the soil being taken to a depth of 2 ft., and are exhibited in specially made glass columns. The soils represent some of our fertile lands, many of which have been under cultivation for a great number of years. There are sugar-cane soils from Mulgrave, Mackay, and Bundaberg; wheat soils from Miles, Roma, and Westbrook; maize soils from Kingaroy, Beaudesert, and Tallegalla; lucerne soils from Murgon and Rosewood; potato soils from Beenleigh, Goombungee, and Lockyer. The collection also includes a soil from Buderim Mountains, well known for its excellent bananas; a soil from the Stanthorpe district, particularly suitable for stone fruit; particularly rich fertile soils from the Bowen district, suitable for citrus fruit and tobacco culture; a typical soil of good grazing

country from Westwood. A printed card gives for each soil a short description of the locality and the crops chiefly grown. The mechanical compositions with regard to the amount of sand, silt, and clay are given, followed by the chemical composition, showing how much of the important plant foods—nitrogen, potash, lime, and phosphoric acid—the soil contains in percentage, and also expressed in lb. per acre to a depth of 12 in.

Seed Corn and Corn-growing Display.—Three descriptive features are represented. Firstly, a collection of seed maize grown at the various departmental propagation plots, originating from grain imported from the United States of America. Systematic attention has been given to seed selection by field officers of the Department, and the produce from the plots is sold to farmers, who in this way have the opportunity of securing approved strains of seed. This season's orders have already absorbed all available stocks. The second feature comprises an educational exhibit, dealing in a comprehensive way with several types of maize. Typical ears of different stud varieties are shown in groups and in glass cases. Special attention has been given to the points governing seed selection in the field and barn, and concise information is furnished on descriptive cards and labels in such a way that anyone may become readily acquainted with the subject. The third section illustrates the final results of the recent corn-growing competition under eighteen years of age. Tabulated returns, prizes, and award cards are displayed in close proximity to the exhibits, which are arranged into groups representing nine different divisions of the State.

Sorghum Trophy.—The seed heads and seed of a number of saccharine and non-saccharine sorghums aggregating ten different kinds are displayed on a large trophy, to effectively present the different characteristics of each. The chief value of this exhibit lies in the fact that the non-saccharine kinds were imported from the United States, where they had established a reputation for drought-resistance. The Department has advertised seeds of respective kinds for sale, and already sufficient orders have been received to absorb all the stocks in hand. It is expected that during the coming season over 300 acres will be placed under crop from the seed so distributed.

Broom Millet Display.—The high price of well-graded and well-prepared fibre (from £37 to £40 per ton in Brisbane) indicates there is good money in this commodity. It is customary for growers to pay somewhat too limited attention to the grading, classing, and baling of the fibre for market. The different samples of fibre and articles in process of manufacture are arranged to serve as a guide for the grower when harvesting and preparing his crop for market, as so much depends on proper preparation and get-up.

Wheat.—In the general display of sheaves of wheat and grain the collection of new crossbred and named varieties of wheat from the Roma State farm are prominent. The bright attractive straws and prolific types of ear generally to be noted indicate that good progress is being made with the development of new varieties. A collection of over

PLATE 9.—A SECTION OF THE WALL DISPLAY IN THE COURT OF THE DEPARTMENT OF AGRICULTURE AND STOCK, NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

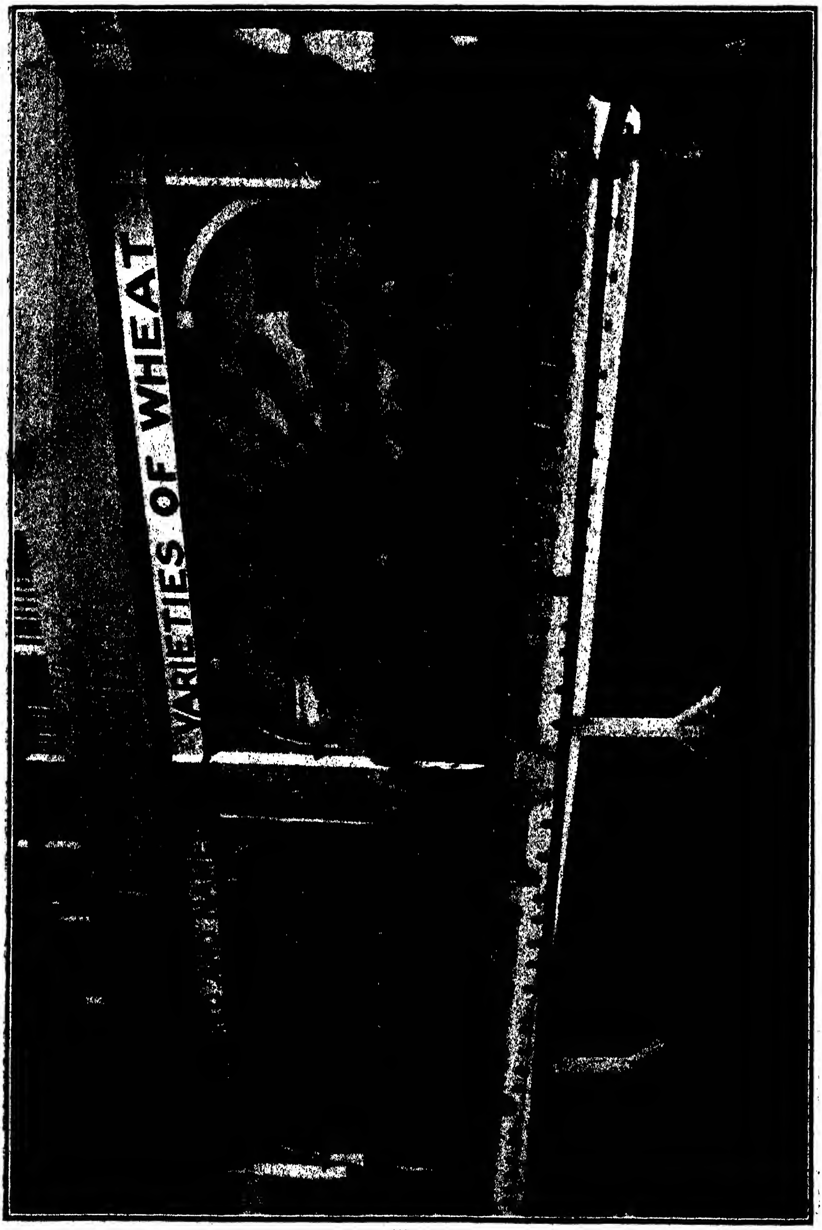


PLATE 10.—SECTION OF THE WHEAT EXHIBIT, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

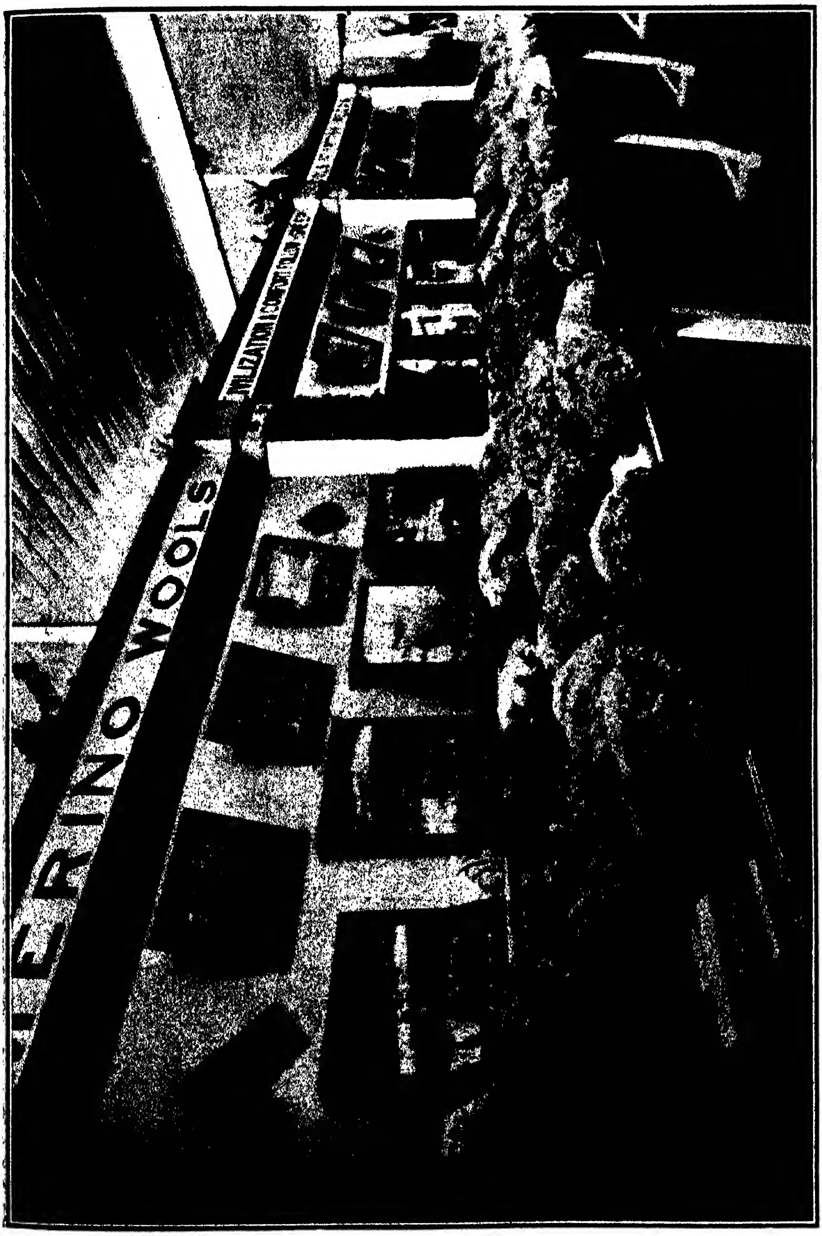


PLATE 11.—DISPLAY OF WOOLS, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

fifty varieties raised at one of the field experimental plots in the Goondiwindi district shows conclusively what this tract of country is capable of producing. In this lot representative Canadian, Indian, Roma, and Southern wheats predominate, and it is interesting to note that a variety known as Pusa No. 12, which is reported to have given such excellent results in India, has also shown out prominently here in relation to its field characteristics.

Wool.—The wool exhibit this year takes a different form from that of other years, and has been arranged for instructional purposes in keeping with the character of this branch of departmental work, as well as to illustrate the perfection which the State has attained in the production of a wide range of notable wools and of different sheep breeds and their crosses. The success of Queensland in this particular section at the Panama Exposition shows that this State can hold its own with any other part of the Commonwealth in the matter of growing high-class wools of all kinds, including British breeds and crossbreds. In regard to the introduction of sheep on coastal areas, the show of British breeds, while not as complete as could be wished, contains good examples of such wools as are produced by the Border Leicester and Romney Marsh breeds. These breeds, so far, have done remarkably well under coastal conditions, and farmers may see the class of wool grown by each of these. The business of growing sheep on the coast is comparatively new, and other varieties may show up just as well as those named in the future, but at present it may be said that these two—Border Leicester and Romney Marsh—do very well. The examples shown are nearly all Queensland grown. One illustrative exhibit is that of a selection of Corriedale wools bred in the Longreach district by Mr. G. C. Greenwood, of Tocal. This example shows that long wools and crossbreds may be bred successfully in the hot West as well as on the coast and the Downs. Other examples show pure Lincoln, Leicester, Border Leicester, Dorset Horn, and Romney Marsh, with their various crosses. There is also a fairly representative selection of merino fleeces of much the same quality as those which gained the gold medal at the Panama Exposition recently. A small exhibit of mohair, Queensland bred, at Miles, by Mr. E. Scammell, is worth inspection.

ONE-FARM EXHIBITS.

There were three entries in this section, the competitors being Messrs. O. C. Williams ([illegible]inby), J. A. Nystrom, Booie, Kingaroy, and Mr. G. Trevitt (Bathurst, New South Wales). On previous occasions—1911 and 1913—the winners were, respectively, Messrs. Allen Bros. of Gympie, who secured a £200 prize (1911), and Mr. H. Franke, of Cawdor (1913).

Of the three competitors at the Exhibition of August, 1915, one had the misfortune to drop out owing to an unfortunate injury to the hand sustained by Mr. G. Trevitt, of Bathurst, New South Wales, through a fall from a ladder. On these exhibits, one of the judges, Mr. C. Siemon, said a lot of time and labour had been expended by both exhibitors, and their displays were a credit to their respective districts, and more so to their own farms. The agricultural products were a

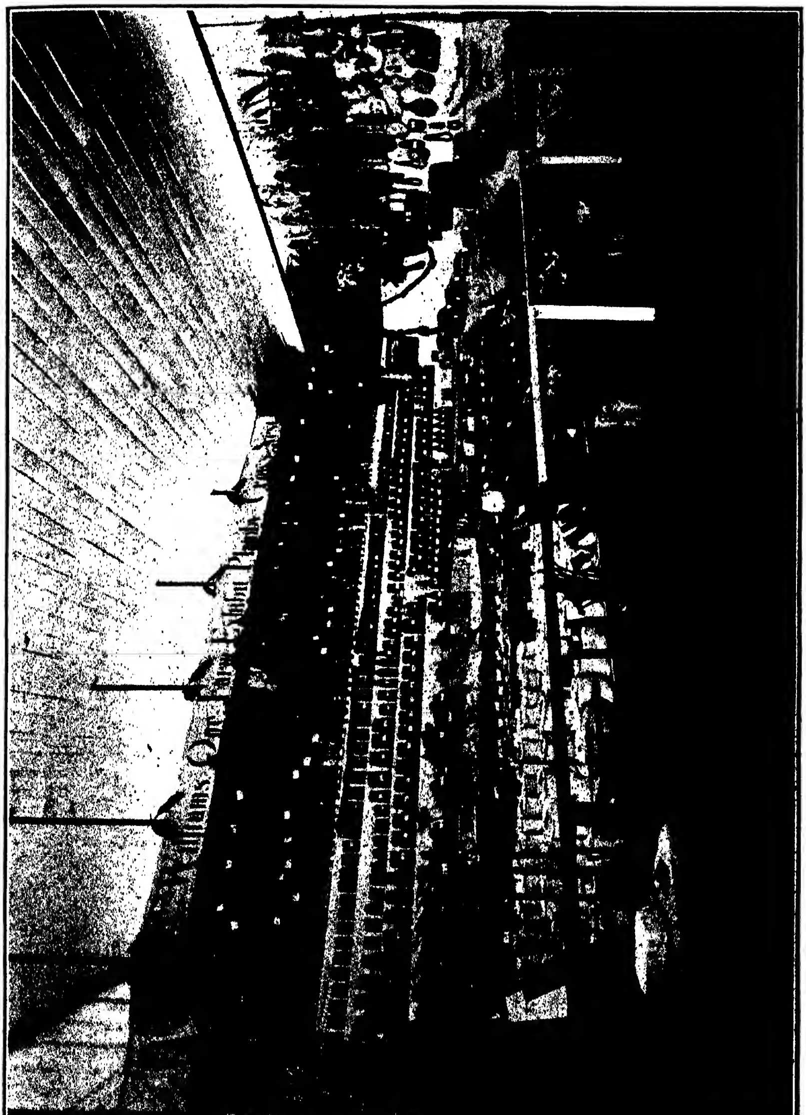


PLATE 12.—O. C. WILLIAMS'S ONE-FARM EXHIBIT AT THE NATIONAL ASSOCIATION SHOW, BOWEN PARK, AUGUST, 1915.

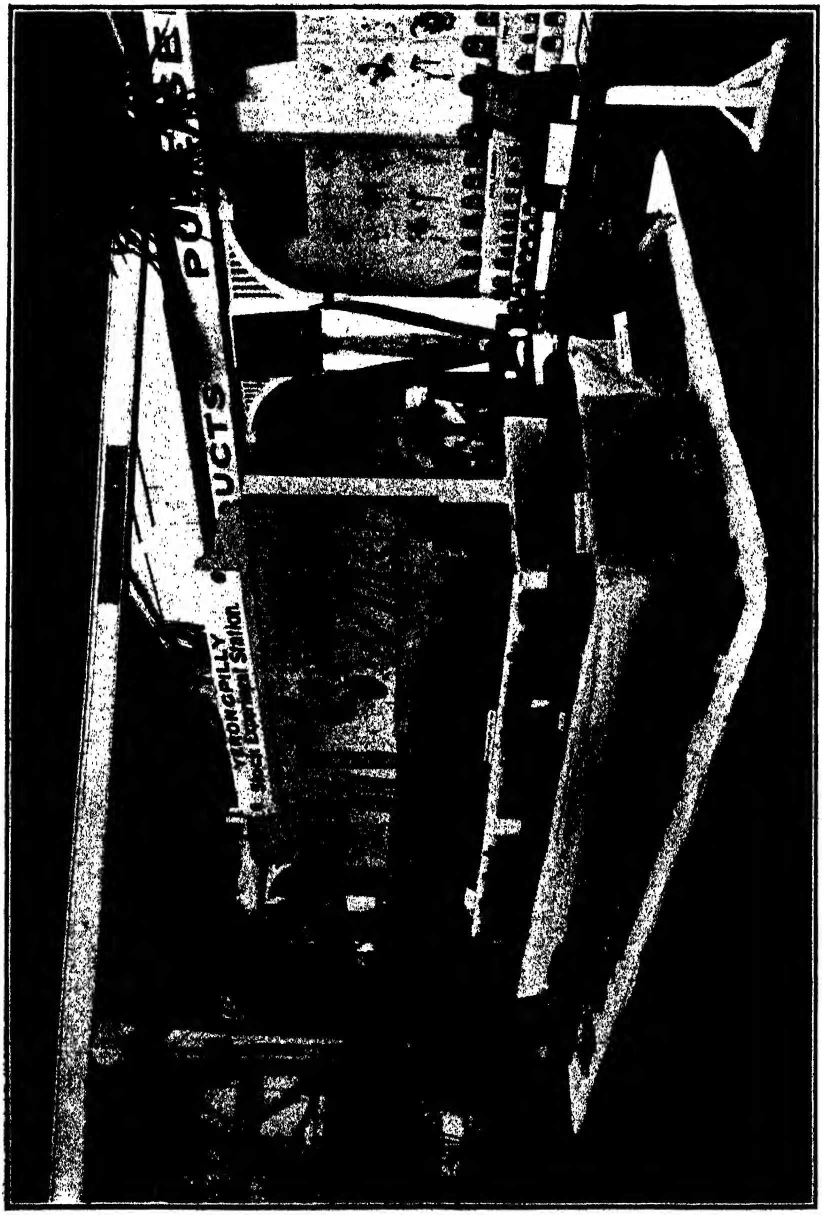


PLATE 13.—EXHIBIT FROM YEERONGPILLY STOCK EXPERIMENT STATION, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

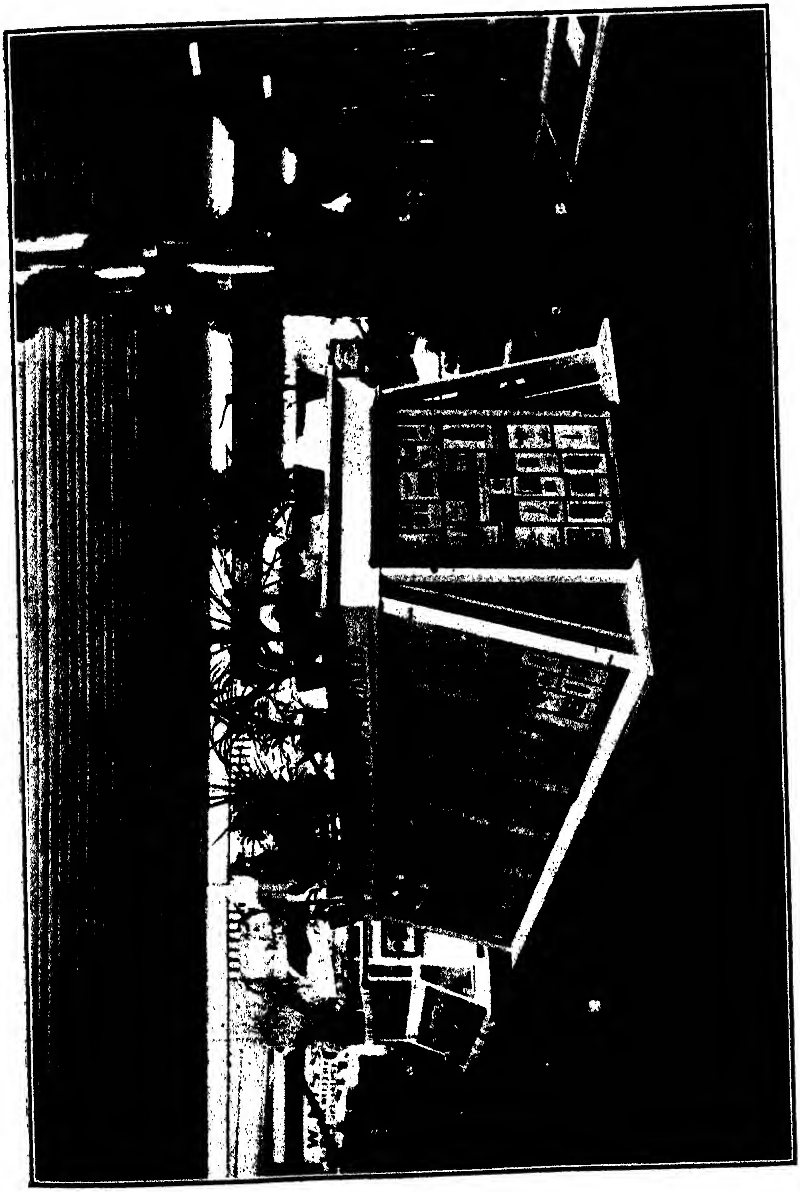


PLATE 14.—DEPARTMENTAL COURT (AGRICULTURE AND STOCK), ENTOMOLOGICAL AND VEGETABLE PATHOLOGICAL EXHIBITS, NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

splendid feature of each competitor's exhibit. The hays, chaffs, and grains forming part of the exhibits were very fine. Another prominent feature in each man's display was the excellent collection of preserves, jams, &c. The vegetable section in each was very poorly represented. The home work by the lady members of Mr. Williams's household was a credit to them. Mr. Williams's labour and time-saving implements used in connection with the work on his farm showed much ingenuity. Mr. J. Fenton, another of the judges, acquiesced with his colleague's remarks. Mr. Williams beat Mr. Nystrom by 57 points.

The following were the points awarded:—

—	Possible.	Nystrom.	Williams.
1. Dairy Produce—			
Butter, 6 lb.	25	18	15
Cheese, one large or two small	20	18	19
Eggs, one dozen	5	3	4
	50	39	38
2. Foods—			
Hams, 15 lb.; bacon, 15 lb.	20	10	15
Corned, smoked, and spiced beef and mutton, 10 lb.	10	5	6
Honey, 12 lb.	10	7	7
Beeswax, 6 lb.	5	3	3
Bread, 2 loaves; scones, 1 dozen ..	5	3	4
Confectionery and sweets, 3 lb.	5	2	5
Lard, tallow, and oils	5	2	4
	60	32	44
3. Fruits, vegetables, and roots, fresh and preserved—			
Fresh fruit, all kinds	25	15	10
Dried fruits	10	6	4
Preserved fruits and jams	15	10	14
Fresh vegetables	15	7	10
Pickles, sauces, &c...	15	10	12
Potatoes (56 lb.), or a collection, and roots	25	18	15
Table pumpkins, squashes, and marrows, 56 lb.	10	6	6
Cocoanuts and nuts	3	2	2
Vegetable and garden seeds, 5 lb. ..	5	3	4
Arrowroot, 10 lb.	5	3	3
Cassava, 3 lb.	5	..	..
Ginger, 3 lb..	5	..	..
Sugar beet, 3 lb.	5	3	3
	143	83	83
4. Grain, &c.—			
Wheat	25	18	14
Maize	20	16	14
Barley	10	7	6
Oats, rye, and rice	15	10	10
	70	51	44
5. Tropical Products—			
Sugar-cane, 24 stalks or 1 stool	30	..	..
Cotton, in seed, 10 lb., long staple ..	10	8	1
Coffee, 10 lb.	15	..	..
	55	8	1
6. Tobacco—			
Tobacco, leaf, dried, 5 lb.	10	..	4
	10	..	4

—	Possible.	Nystrom.	Williams.
7. Hay, Chaff, &c.—			
Hay, oaten, wheaten, lucerne, and other varieties	20	8	17
Grasses and their seeds, including canary	10	4	8
Chaff, oaten, wheaten, lucerne, and other varieties	20	6	15
Ensilage, any form	15	..	6
Cattle fodder (pumpkins and green fodder)	15	8	10
Sorghum and millet	10	5	6
Hemp, 5 lb.	5	..	..
Flax, 5 lb.	5	..	2
Cowpea seed, 7 lb.	7	5	2
Broom millet, 10 lb.	10	8	5
	117	44	71
8. Wool—			
Greasy, 5 fleeces	20	10	10
Mohair	5	..	2
	25	10	12
9. Drinks, &c.—			
Temperance drinks, 6 bottles	10	5	4
	10	5	4
10. Women's and Children's Work—			
Needlework, knitting, fine arts	10	3	8
School work, maps, writing, &c.	10	..	8
Fancy work	10	6	8
	30	9	24
11. Miscellaneous Articles of Commercial Value ..	5	2	4
12. Plants and Flowers, in pots	5	1	3
13. Time and Labour Saving Useful Articles, made on the farm	10	..	7
14. Effective Arrangement of Exhibits	10	6	8
	600	290	347

CORN-GROWING COMPETITION.

This interesting and, from a rural educational point of view, most highly valuable competition, which was arranged by the Department of Agriculture and Stock last year, was concluded on 30th June, 1915, and adjudicated upon in July last. For several reasons, principally climatic, the competitiors were grouped according to nine districts, embracing the whole State from the border of New South Wales northwards to Cooktown, and westwards as far as Longreach, Cunnamulla, and Wallangarra, thus including every town and rural district throughout the State, the divisions being nine in number—viz., Logan, West Moreton, Darling Downs North, Darling Downs South, Maranoa, Moreton, Wide Bay and Burnett, Central Queensland, and North Queensland. Prizes of the following value were awarded:—First £5, second £2, third £1, and in addition three special prizes to the value of £10, £5, and £3 to be awarded to the competitors who stood first, second, and third in the whole competition. The conditions will be found on page 61 of the August issue of this Journal, 1915, and also on page 124 of this issue. It is notified

by the Department that a similar Corn-growing Competition to that of 1914-15 will be held for 1915-16, entries closing with the Under Secretary, Department of Agriculture and Stock, Brisbane, on the 30th September next.

DISTRICT PRIZE WINNERS.

	Points	£	Yield. Bushels per Acre.
West Moreton—			
J. R. C. Hart, Blackbutt	86.4	5	92
F. A. Bade, Rosewood	65·8	2	69
A. M. Bachmann, Marburg	60·7	1	56
Darling Downs North—			
N. S. Smoothy, Pinelands, Crow's Nest	77·1	5	83
H. W. Abel, Geham	74·9	2	82
F. Franke, Cawdor	72·2	1	76
Darling Downs South—			
Albert Gouchee, North Killarney	72·5	5	74·7
Archibald Gouchee, North Killarney	49·5	2	44·5
A. E. Ernst, Spring Creek, Clifton	44·1	1	42·8
Maranoa—			
F. R. Rowland Bell	29·7	5	22
(One competitor, only one prize.)			
Moreton—			
R. Rudd, Upper North Pine	56·4	5	52
F. Woodford, Samford	49·9	2	47
S. R. Hulse, Yandina	48·3	1	47·6
Logan—			
F. M. Birt, Nerang	46·8	5	41·2
E. L. Marshall, Gramzow	46·8	2	44
R. A. Tulloch, Veresdale	41·3	1	39
Burnett and Wide Bay—			
A. Fittell, Eel Creek, Gympie	63·9	5	67
F. H. J. Hayden, Kingaroy	59·5	2	55
E. Hayden, Kingaroy	51·1	1	48
Central Queensland—			
R. J. Philp, Mount Larcom	58·1	5	72·9
Isabella Wilson, Yeppoon	57·9	2	62·3
F. Williams, Barmoya	44·4	1	41·9
North Queensland—			
Mary R. Dougherty, Malanda	72·4	5	82
J. D. Gellweiler, Kulara, Cairns	58·7	2	61
R. Vance, Barrine	47·2	1	44·3

SPECIAL PRIZE WINNERS.

J. R. C. Hart, Blackbutt (West Moreton), £10.

N. S. Smoothy, Pinelands, Crow's Nest (Darling Downs North), £5.

H. W. Abel, Geham, Crow's Nest (Darling Downs North), £3.

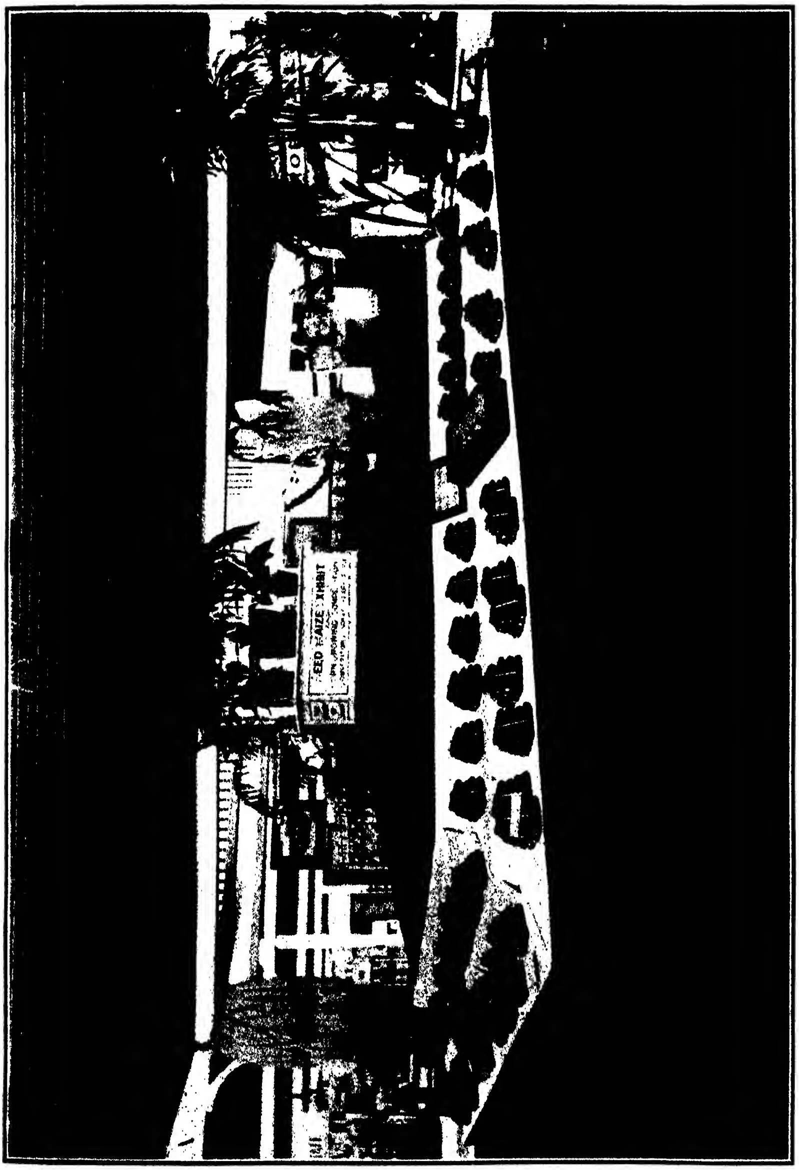


PLATE 15.—STUD-SEED MAIZE AND CORN-GROWING COMPETITION EXHIBIT, DEPARTMENTAL COURT (AGRICULTURE AND STOCK), NATIONAL ASSOCIATION SHOW, BRISBANE, 1915.

EXHIBITION NOTES, 1915.

MILK TESTS.

National Champion Butter-fat test. £25 special prize, and a cash prize of £2 2s. yearly to the winner (presented by the Brisbane Newspaper Co., Ltd.). To be won three times by the same exhibitor, but not necessarily to be in succession or by the same exhibit. Cow, 4 years and over, averaging the greatest daily yield of butter-fat for 48 hours:—

—	—	Milk, Lb.	Test.	Commercial Butter.	Average, 24 Hours.	Lact. Points.	Total, 24 Hours.
C. Bloss's Canary, Jersey	M.	20·1	3·2	·70	..	..	
	E.	18·9	4·6	·95	..	..	
	M.	17·12	4·3	·84	..	0	
	E.	18·2	4·2	·84	26·64	12	38·64
Messrs. McIntyre Bros.' Handsome, Milking Shorthorn	M.	28·6	3·2	·98	..	0	
	E.	29·0	3·6	1·14	..	..	
	M.	31·11	3·7	1·28	..	..	
	E.	28·1	4·0	1·23	37·04	..	37·04
D. Dunn's Blossom III., Illawarra ..	M.	27·8	3·0	·89	..	..	
	E.	26·9	3·4	·98	..	..	
	M.	27·6	3·4	1·01	..	..	
	E.	25·8	4·0	1·12	32	7	32·7
J. and L. Paten's Jeanette of Wanora, Ayrshire	M.	23·9	4·5	1·18	..	0	
	E.	20·12	4·2	·96	..	..	
	M.	23·9	3·5	·89	..	..	
	E.	21·1	4·0	·93	31·68	..	31·68
D. Dunn's Jemima II. of Valley View, Illawarra	M.	27·1	2·6	·75	..	0	
	E.	25·14	4·1	1·17	..	..	
	M.	25·12	3·9	1·10	..	..	
	E.	22·22	3·7	·90	31·36	..	31·36
H. Marquardt's Roan, Milking Shorthorn	M.	18·12	3·8	·78	..	..	
	E.	18·4	4·1	·82	..	..	
	M.	17·10	3·6	·69	..	..	
	E.	18·5	4·1	·83	24·96	5	29·96
W. F. Hammell's Plum, Grade ..	M.	19·12	3·7	·80	..	..	
	E.	17·15	4·4	·87	..	..	
	M.	17·13	3·5	·65	..	..	
	E.	17·12	4·1	·80	24·96	3·1	28·06
V. Goodger's Pansy	M.	24·6	4·1	1·10	..	..	
	E.	14·2	4·5	·70	..	..	
	M.	19·15	2·9	·62	..	..	
	E.	17·6	4·2	·81	25·84	0	25·84
W. Middleton's Ruby of Devonport, Milking Shorthorn	M.	17·8	3·2	·61	..	..	
	E.	16·14	4·7	·88	..	..	
	M.	18·0	4·5	·90	..	..	
	E.	16·11	4·4	·81	25·60	0	25·60
V. Goodger's Roaney	M.	18·6	3·5	·70	..	..	
	E.	17·2	4·8	·91	..	..	
	M.	16·12	3·0	·54	..	..	
	E.	17·13	4·4	·87	24·16	0	24·16
E. Burton's King Lear's Buttercup, Jersey	M.	17·6	3·6	·68	..	..	
	E.	16·0	4·1	·72	..	..	
	M.	15·4	3·6	·66	..	..	
	E.	12·6	4·6	·63	21·04	·5	21·54
W. Middleton's Maggie, Milking Shorthorn	M.	23·9	2·3	·57	..	..	
	E.	24·10	2·9	·76	..	..	
	M.	27·0	2·3	·65	..	..	
	E.	24·15	2·5	·66	21·12	0	21·12

BUTTER AWARDS.

Following are the awards in the Butter Section:—

SALT BUTTER WITHOUT PRESERVATIVE, SUITABLE FOR EXPORT.

—	Flavour	Texture.	Col.	Salting.	Packing and Finish.	Totals.
Caboolture Co-operative Dairy Co., Ltd., Caboolture	55	19½	7	4	4	89½
Stanley River Co-operative Dairy Co., Ltd., Woodford	54	19½	7	4	4	88½
Killarney Dairy Co., Ltd., Killarney ..			Disqu	alified.		
Warwick Butter and Dairying Co., Ltd., Warwick	57	18	6	4	4	89
Warwick Butter and Dairying Co., Ltd., Allora	57	18½	7	4	4	90½
Warwick Butter and Dairying Co., Ltd., Texas	58½	19	6½	4	4	92
Marburg Butter Factory, Marburg ..	54	18½	6	4	4	86½
Mount Bismarck Co-operative Dairy Co., Mount Bismarck			Disqu	alified.		
Downs Co-operative Dairy Co., Ltd., Toowoomba	59½	19½	7	4	4	94
Logan and Albert Co-operative Dairy Co., Ltd., Beaudesert	52	18½	7	4	4	85½
Inverell Co-operative Butter Co., Ltd., Inverell, N.S.W.	56	19	6½	4	4	89½
Queensland Farmers' Co-operative Co., Ltd., Booval	55	19	6½	4	4	88½
Queensland Farmers' Co-operative Co., Ltd., Boonah	58	20	7	4	4	93
Queensland Farmers' Co-operative Co., Ltd., Grantham	55	20	7	4	4	90
Queensland Farmers' Co-operative Co., Ltd., Laidley			Disqu	alified.		
Atherton Tableland Co-operative Butter and Bacon Co., Ltd., Atherton			Disqu	alified.		
Oakey District Co-operative Dairy Co., Oakey	53	19½	7	4	4	87½
Goombungee Co-operative Dairy Co., Ltd., Goombungee	59	19½	7	4	4	93½
Kin Kin Co-operative Dairy Co., Ltd., Kin Kin	54	19	7	4	4	88
Silverwood Dairy Factory, Ltd., Terror's Creek	55	19	7	4	4	89
Silverwood Dairy Factory Co., Ltd., Gatton	53	19	7	4	4	87
Maryborough Co-operative Dairy Co., Ltd., Kingaroy			Disqu	alified.		
Maryborough Co-operative Dairy Co., Ltd., Biggenden			Disqu	alified.		

Taking into consideration the closeness of the complete results in the case of the Downs Co-operative Dairy Co., Ltd., Toowoomba, which was only half a point behind the Goombungee Co-operative Dairy Co., Ltd., the judge recommended that an additional prize be awarded.

AGGREGATE AWARD.

Special prize for the factory securing the highest aggregate number of points in all classes, and special prizes.

—	Unsalted, Factory Made.	Fresh, Factory Made.	Export, 30 Days, Storage.	Without Preservative.	Export, 8 Weeks' Storage.	Aggregate.
Goombungee Co-operative Dairy Co., Ltd., Goombungee	96	95	93	93½	93	470½
Downs Co-operative Dairy Co., Ltd., Toowoomba	95½	94½	94½	94	91½	470
Queensland Farmers' Co-operative Co., Ltd., Grantham	92½	93	95½	90	95	466
Queensland Farmers' Co-operative Co., Ltd., Boonah	91½	90½	91½	93	94½	461
Inverell Co-operative Butter Co., Ltd., Inverell, N.S.W.	92½	92	92	89½	91	457
Warwick Butter and Dairying Co., Ltd., Texas	91	90½	90	92	89½	453
Warwick Butter and Dairying Co., Ltd., Allora	91½	90½	88	90½	89½	450
Silverwood Dairy Factory Co., Ltd., Terror's Creek	91	89	90	89	90½	449½
Marburg Butter Factory, Marburg ..	93	90	90	86½	89½	449
Silverwood Dairy Factory Co., Ltd., Gatton	90½	91	91	87	89	448½
Queensland Farmers' Co-operative Co., Ltd., Booval	91	90½	90½	88½	88	448½
Oakey District Co-operative Dairy Co., Oakey	89½	88½	87½	87½	90	443
Stanley River Co-operative Dairy Co., Ltd., Woodford	90½	89½	89	88½	85	442½
Kin Kin Co-operative Dairy Co., Kin Kin	89½	89½	87	88	88	442
Warwick Butter and Dairying Co., Ltd., Warwick	91	87½	82	89	90½	440
Logan and Albert Co-operative Dairy Co., Ltd., Beaudesert	90½	88½	89	85½	86	439½
Maryborough Co-operative Dairy Co., Ltd., Kingaroy	90	92	92½	..	92½	367
Mount Bismarck Co-operative Dairy Co., Mount Bismarck	90½	91½	90	..	91	363
Queensland Farmers' Co-operative Co., Ltd., Laidley	91	91½	89	..	88	359½
Caboolture Co-operative Dairy Co., Ltd., Caboolture	91	89	87½	89½	..	357
Maryborough Co-operative Dairy Co., Ltd., Biggenden	89½	86½	87	..	85½	348½
Killarney Dairy Co., Ltd., Killarney ..	85½	85½	90	..	87	348
Maleny Co-operative, Maleny	88½	86	88½	..	84½	347½

Subsequent to the awards being made known, the judge, Mr. G. S. Stening, stated to a representative of the "Brisbane Courier" that the sections judged by him (butter, cheese, bacon, hams, and lard) showed a great improvement on former exhibits of their kind, not so much from points of excellence, but rather from the aspect of general consistency of quality. The points for the winning butters, he said, might not be as high as those in former years, but there was a greater number of butters coming into first grade than hitherto. This in itself was a striking evidence of the educational bearing that exhibits of this nature had upon manufacturers showing in the several sections. The drought the dairying districts had passed through in this State was no doubt a factor in the want of excellence on account of the part played by the breed of cattle and the quality of the pastures at the time the

butter or cheese was manufactured for show purposes. In butter, outside the flavour, the manufacture showed a striking improvement, and with the exception of a few exhibits, compared more than favourably with that of New South Wales. However, there was one detail in manufacture requiring further attention, and that was the working of the butter, for unless the working was sufficiently carried on not only texture faults, but faults in colour, were sure to arise. With this defect overcome the manufacture of the butters would be all that could be desired.

CHEESE AWARDS.

The competition for the prizes in the cheese section was considerable, and of the successful competitors the Southwood Co-operative Dairy Company carried off three first prizes in the six classes. The Rosalie Cheese Factory at Leyburn annexed two firsts and the Leyburn Dairy Company, Limited, came first for matured cheeses. The awards were:—

—	Flavour.	Texture.	Colour.	Finish.	Total.
Two Exports, 70-80 lb., White, Suitable for English market.					
Possible points	50	25	15	10	100
J. Wilson, Worongary, S. C. line	40	24	15	9½	88½
Warwick Butter and Dairying Co., Elbow Valley	42½	24	15	9	90½
Westmore Cheese Factory, Westmore, *via* Killarney	42	24½	15	9½	91
Rosalie Cheese Factory, Glencoe	42	24	15	9	90
Southbrook Co-operative Dairying Co., Southbrook	45	25	15	9½	94½
Downs Co-operative Dairy Co. Cheese Factory, Hodgson's Vale	45	24½	15	9½	94
Mount Tyson Farmers' Co-operative Dairy Co., Ltd., Mount Tyson	44	24½	15	9	92
Two Exports, 70-80 lb., Coloured, Suitable for English market.					
J. Wilson, Worongary, ...	40	24	15	9½	88½
Warwick Butter and Dairying Co., Elbow Valley	42	24½	14½	9	90
Westmore Cheese Factory, Westmore, *via* Killarney	40½	24½	15	9	89
Rosalie Cheese Factory, Glencoe	43	24½	15	9½	92
Southbrook Co-operative Dairy Co., Southbrook	45	25	15	9	94
Downs Co-operative Dairy Co., Hodgson's Vale	44½	24½	15	9	93
Kooroongarra Co-operative Dairy Co.	43½	25	15	9	92½
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	43	24½	15	9	91½
Two Medium not exceeding 40 lb. matured.					
Warwick Butter and Dairying Co., Elbow Valley	40	25	15	9	89
Rosalie Cheese Factory, Glencoe	42	25	15	9½	91½
Southbrook Co-operative Dairy Co., Southbrook	38½	24½	15	9	87
Westmore Cheese Factory, Westmore, *via* Killarney	39	24½	15	8½	87
Rosalie Cheese Factory, Glencoe	44	24½	15	9½	93
Southbrook Co-operative Dairy Co., Southbrook	40	24	15	8½	87½
Downs Co-operative Dairy Co.'s Cheese Factory, Hodgson's Vale	42½	24½	15	9½	91½
Biddeston Co-operative Dairy Co., Ltd., Biddeston, *via* Oakey	41½	24½	15	9	90
D. Keir, Bellthorpe, *via* Woodford	40½	24	15	8½	88
Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount	40½	24	15	9	88½
Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount	41½	24½	15	9	90
Greenmount Dairy Co., Ltd., No. 2 Factory, Greenmount	40½	24	15	9	88½
Greenmount Dairy Co., Ltd., No. 6 Factory, Greenmount	41½	24	15	9	89½
Greenmount Dairy Co., Ltd., No. 6 Factory, Greenmount	43	24½	15	9½	92

—	Flavour.	Texture.	Colour.	Finish.	Total.
Two Loaf Cheeses, not exceeding 12 lb., under two months old.					
Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount	43	24½	15	9	91½
J. Wilson, Worongary, S.C. line	41½	24½	15	9½	90½
Warwick Butter and Dairying Co., Elbow Valley	41½	24½	15	9	90
Westmore Cheese Factory, Westmore	39	24	15	9	87
Westmore Cheese Factory, Westmore	39½	24	15	9	87½
Rosalie Cheese Factory, Glencoe	42	24½	15	9½	91
Southbrook Co-operative Dairy Co., Southbrook	43½	24½	15	9	92
Kooroongarra Co-operative Dairy Co., Kooroongarra	41	24½	15	9	89½
Downs Co-operative Dairy Co., Ltd., Toowoomba	42	24½	15	9½	91
Biddeston Co-operative Dairy Co., Ltd., Biddeston	41	24	15	9	89
Leyburn Dairy Co., Ltd., Roma street, Brisbane	41½	25	15	9	90½
Pittsworth Dairy Co., Ltd., Pittsworth	42	24½	15	9	90½
Moola Cheese Factory, Braeside, *via* Dalby ..	41	24½	15	9	89½
Downs Co-operative Dairy Co., Ltd., Toowoomba	41½	24	15	9	89½
Biddeston Co-operative Dairy Co., Ltd., Biddeston, *via* Oakey	41	24½	15	9	89½
Leyburn Dairy Co., Ltd., Roma street, Brisbane	44	24½	15	9½	93
Mount Tyson Farmers' Co-operative Dairy Co., Ltd.	44	24½	15	8½	92
Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount	41	25	15	9	90
Greenmount Dairy Co., Ltd., No. 2 Factory, Greenmount	41	25	15	9	90
Two Medium, not exceeding 40 lb., under two months old.					
J. Wilson, Worongary, S.C. line	40	24½	15	9½	89
Warwick Butter and Dairying Co., Ltd., Elbow Valley	42	24	15	8½	89½
Westmore Cheese Factory, Westmore, *via* Killarney	41	24	15	9	89
Rosalie Cheese Factory, Glencoe	44	25	15	9½	93½
Southbrook Co-operative Dairy Co., Southbrook	42	25	15	9	91
Kooroongarra Co-operative Dairy Co.	43½	25	15	9	92½
Downs Co-operative Dairy Co., Ltd., Toowoomba	43	24½	15	9	91½
Leyburn Dairy Co., Ltd., Roma street, Brisbane	42	24½	15	9	90½
Pittsworth Dairy Co., Ltd., Pittsworth	42	25	15	9	91
Moola Cheese Factory, Braeside, *via* Dalby ..	41	24½	15	9	89½
Moola Cheese Factory, Braeside, *via* Dalby ..	42	24½	15	9	90½
Burnside Cheese Factory, Tannymorel	42	25	15	8½	90½
Cambooya Dairying Co., Ltd., Cambooya (No. 1)	40	24	15	9	88
Cambooya Dairying Co., Ltd., Cambooya (No. 2)	39	24	15	9	87
Greenmount Dairy Co., Ltd., No. 3 Factory, Greenmount	42	24½	15	9½	91
Two Loaf Cheeses not exceeding 12 lb. matured.					
Warwick Butter and Dairying Co., Elbow Valley	38	24	15	8½	85½
Moola Cheese Factory, Braeside	40½	24½	15	9	89
Burnside Cheese Factory, Tannymorel	42	24½	15	9	90½
D. Keir, Bellthorpe, *via* Woodford	40½	24½	15	9	89
Wm. Smith, Yangan	41	24½	15	8½	89
Cambooya Dairy Co., Ltd., Cambooya (No. 1)	40½	24	15	9	88½
Cambooya Dairy Co., Ltd., Cambooya (No. 2)	42	24	15	9	90

COTTAGE GARDEN COMPETITION.

It is many years since the National Association first offered a prize for the best cottage garden in and in the suburbs of Brisbane, and it is highly satisfactory to find that the Council of the Queensland National Association have this year offered substantial prizes for the laudable purpose of encouraging a taste for flower and vegetable gardening in Brisbane and its suburbs, and the satisfactory response to the Association's invitation to compete in this section affords good evidence that the movement has been greatly appreciated. In the year 1881 we ourselves obtained the Society's medal and certificate in the only competition of this description which had been held up to that date. There were, if our memory serves us, seventeen entries, and the conditions were much the same as those laid down for competitors in the Cottage Garden Section in August, 1915.

The revival of the garden competitions cannot but have a beneficial effect in the direction of beautifying the surroundings of suburban dwellings, and incidentally will possibly lead to the establishment of a very lucrative business in the cut-flower trade. This year, 36 gardens competed, and were judged by Messrs. J. Soutter and Mr. J. F. Bailey, Colonial Botanist, who remarked on the area, soils, plants, &c., that there was a great sameness in the laying out of the gardens, and that in some districts, notably Paddington, there was a want of the first essential for successful gardening—*i.e.*, water, and much patience and industry had been shown by competitors in that district to overcome the difficulty.

The following are given as the results obtained by the first twelve of the competitors:—

The numbers represent—1, general effect in laying out gardens, &c.; 2, variety and condition of plants; 3, quality of flowers and foliage plants; 4, quality and quantity of vegetables; 5, condition of garden generally:—

—	1	2	3	4	5	Total.
W. F. Greenslade, Clayfield	12	6	9	12½	9	48½
J. Smith, Church street, Red Hill	12½	7	9	11	8	47½
W. Brewster, Byrne Estate	12	7	12	8	8	47
Mrs. Grenning, Zillmere	10	7	10	11	8	46
J. H. Buxton, Bowen Hills	12	7	9	10	7	45
H. Hacker, off Bowen Bridge road	12	7	9	9	6	45
C. Short, Toowong	10	7	13	10	6	45
Jas. Hamilton, Kennedy terrace	10	7	9	12	6	44
R. Fulcher, Kennedy terrace	11	8	11	7	7	41
R. Littleford, View street, Paddington	9	7	9	12	7	44
W. Bell-Booth, Duke street, Thompson Estate	10	7	8	10	7	42
R. J. Street, Duke street, Thompson Estate	10	7	9	9	7	42

The judges in their report state that the first and second prizes were won by elderly gentlemen, who seemingly devote the whole of their time to tending their gardens, and, therefore, may be considered to have an advantage over those who, having occupations which take them daily from home, can only spare odd times for the work, but this is not a point to be taken into consideration by the judges. Several of the competitors were handicapped by having paid little or no attention to the vegetable portion of their gardens. In one of these gardens—namely, that of Mr. P. Dowd, of Bell street, Kangaroo Point, was an illustration of what good effect may be obtained from grass and shrubs, with a touch of the old-fashioned carpet-bedding. The whole area is laid down in grass with roses and other shrubs dotted here and there, and is kept in beautiful order. Another, at Clayfield, was tended solely by Mr. Scott, a young man employed by the Tramways Company. This garden is most tastefully laid out, and the massing of plants of one kind will be sure to prove effective later on in the spring. Mr. Thomas's garden at Indooroopilly could only be judged so far as flowers and vegetables were concerned, as the large area at the disposal of the owner placed it at an advantage far beyond that of one eligible for competition as a "cottage garden." Here are to be seen some fine palms and other trees bordering the drive, and placed on the lawns. A feature of this garden is a hedge composed of pink and red Bougainvilleas, the gorgeousness of which is almost beyond description. The pink variety is also used with beautiful effect trained along the veranda. It would be worth while for anyone interested to take a trip along Hart's road to see the effect produced by using these plants in this manner. Mr. Greenslade's garden is an ideal "cottage garden," sufficient plants being grown to beautify the home on the one hand, and to supply the household requirements on the other hand. Mr. Smith's effort has been made under most unfavourable conditions so far as position is concerned, as it stands on the side of a steep hill, with a low depth of soil to work upon. The leading feature of Mr. Brewster's garden is the excellent display of sweet peas and Shasta daisies. In each garden every inch of space has been used to advantage.

We are indebted to the courtesy of the Secretary of the National Association for the following correct list of prize-takers in the District and One-Farm Exhibits for the past thirteen years.

DISTRICT EXHIBITS.

First Award.

1903—5 Competitors	Moreton Districts, Nundah, and Zillmere.
1904—7 Competitors	Moreton—Combined Moreton Association.
1905—8 Competitors	Moreton.
1906—6 Competitors	Wide Bay and Burnett and Moreton—equal.

1907—3 Competitors	Moreton.
1908—3 Competitors	Central Queensland.
1909—5 Competitors	Wide Bay and Burnett.
1910—No entries.	
1911—"A" Grade, 1 Competitor ...	Central Queensland.
"B" Grade, 3 Competitors ...	Lowood and Tarampa District.
1912—"A" Grade, 3 Competitors ...	Central Queensland.
"B" Grade, 2 Competitors ...	Kingaroy.
1913—"A" Grade, no entries.	
"B" Grade, 5 Competitors ...	Fassifern.
1914—"A" Grade, 2 Competitors ...	North Coast Agricultural Societies' Union, Lismore, N.S.W.
"B" Grade, 8 Competitors ...	Fassifern.
1915—"A" Grade, 3 Competitors ...	South Coast District Display Association.
"B" Grade, 5 Competitors ...	Gympie.

ONE-FARM EXHIBITS.

First Award.

1910—6 Competitors (and 1 non-competitive)	Prevost Brothers, Moss Vale, N.S.W.
1911—1 Competitor	Allen, D. H. A. and W., Chatsworth, Gympie.
1912—2 Competitors (and 1 non-competitive exhibit)	Muller, T. P., Tirroan, Gin Gin.
1913—2 Competitors	Franke, H., Cawdor.
1914—5 Competitors	Todd, A. P., Rockhampton.
1915—3 Competitors (one retired)	Williams, O. C.

HOUSEHOLD HINTS.

THE VALUE OF VINEGAR.

All housewives would seldom be without vinegar on the kitchen shelf if its value were more widely known.

Its usefulness in the household can hardly be over-estimated, as there are a surprisingly large number of duties that can be rendered comparatively easy by its application.

The boiling of eggs when the shells are cracked sometimes proves a little difficult. When this happens, add a small quantity of vinegar to the water, and the egg will be cooked as satisfactorily as if the shell had been undamaged.

Where it is desired to keep meat, and the more costly methods are impossible, the use of vinegar will again overcome the difficulty. Simply wrap the meat in a cloth wet with vinegar and it will be kept nice and fresh. Wash off the vinegar before cooking operations.

Vinegar heated to boiling-point will also be found a most effective softener of hard brushes which have become dry and otherwise too hard to use.

Then, a little vinegar rubbed over the hands when they have become red and discoloured through rough work or too frequent dabbling in soapy water will greatly improve and whiten them.

Pastoral.

SETTLERS' FLOCKS ON COASTAL LANDS.

Mr. J. R. Chisholm writes us as follows from The Plains, Prairie, N.Q.:—

Since writing my paper on settlers' flocks, I have been through from Gladstone to Tamworth, in New South Wales, by rail, and I think now, by what I saw of some lands, and what I heard from those I travelled with and met, that I may have treated the matter of worms in coast-kept sheep too lightly. Will you therefore please give me space for a few lines more on this subject.

Although in my paper I referred to coast flocks in the North being successfully kept, and with little attention, yet these I know are on sweet country, and I saw much land—between Bundaberg and Maryborough, for instance—that, I should say, was not sweet, and I would say there may be areas about Gatton, Helidon, and thereabouts also wormy country; and I spoke with a New England man in the train, and he tells me of much of his district where the sheep have to be drenched continually to keep them healthy. Throughout New Zealand they grow good sheep and superfine wools, and those seen from the train look healthy enough; hence stockowners there must deal with worm troubles successfully.

My object in writing is to encourage the small settler to keep sheep, and just now is his opportunity, for breeding sheep from the Longreach district could be bought cheaply, and they would be merinos; but a settler buying a little lot, of 25 to 50, could get a Lincoln, Corriedale, or Border Leicester ram, or a good Shropshire or Romney, when he would soon have big lambs, and could pot the ewes for his pigs. However, I was going to refer to worms in sheep, and wished to emphasise the ease with which a small flock is handled. Some years ago we got some Lincoln rams from South Australia, and, unknown to me, they were transhipped in Sydney, and kept in a wormy paddock out by Rooty Hill for a few days. When they came here I let them go with sheep in a paddock, and some time afterwards I saw they were doing no good; so I got Mr. Collins, the stock inspector, then at Hughenden, to come down. He had been about the Burnett country as a lad, when it was all sheep-stocked, and he said at once that the rams were wormy. I said they had come off a sound country in South Australia and this could not be. However, we killed one, and found both tape and stomach worms (the little red fellows). We at once drenched the rams with an arsenic drench, but it was a good while before they did any good; and, by the way, the Lincolns were never very much of a success here. However, some time afterwards, we found worms in the sheep where these rams had been, and we drenched 1,500 of them in half a day—quite effectively, too, because we never

had any more worm trouble; but, as I said in my paper, ours is a dry country. Think, then, how quickly a home flock could be handled.

At that time, however, we read up a good deal of literature on worms in sheep, and to me, anyone who could talk worms in sheep was congenial company. Much of my reading goes to show that most sheep worms find their resting places by the medium of dirty water. Little waterholes and small excavations would be the home of worm eggs in dry weather. The man who waters his sheep out of troughs supplied from a well will have less trouble than his neighbour with a small dam or tank excavation.

In many of the American States sheepowners have worm troubles. They give common salt in plenty, and sulphate of iron, about 2 oz. of the latter to 1 lb. of salt. The sulphate of iron must be added to the salt a little at a time, otherwise you may put the sheep off it. A popular worm remedy in American sheep husbandry is gasoline. They add this to the lick, only a drop or two at first, to get the sheep used to the smell of it, then add little by little. Turpentine and coal tar mixed would be about equal to the gasoline. I believe in turpentine as a worm remedy for all stock, and for sheep it is popular and effective in many countries. The dose is one cup of turpentine to two cups of milk, giving the grown sheep half of a small-sized sauce bottle to each dose, after starving them for twenty-four hours. Keep them in for a few hours, and then let them out for a feed, and shut them in again, watching the droppings for results. In all dosing and medicinal matters, one must be guided by results and see what good is done by the dosing, so that the treatment may be known to be effective or, if otherwise, that some other may be substituted. Home flocks of sheep should be quiet, ready feeders and, where this is so, they can easily be given any medicine mixed with food, provided judgment is exercised in mixing a very little at a time so that they may not be put off it.

The treatment I have suggested may deal with stomach worms and tapeworms successfully. Where the more malignant varieties of worms affecting the head, liver, and lungs of sheep are found, it is matter for consideration if the land cannot be put to better profit than may accrue from sheep.

WHEAT AND GRASS CULTIVATION.

BY P. R. GORDON.

If the present disastrous European war has the effect of greatly extending the cultivation of wheat in Queensland, it will also, incidentally, greatly benefit the meat export trade and the pastoral industry generally. Many thoughtful men among the pastoralists hold the opinion that the time is not far distant when the cultivation of exotic grasses on much of the available waste lands on the coast watershed, and for many miles inland, west of the coast range, will be resorted to by many of our more enterprising graziers, and the extension of wheat growing will provide the very best conditions for inaugurating such a system.

It will, of course, be known to many of our wheatgrowers that the first great impetus to wheatgrowing in New South Wales was by the inauguration of what is known as the share-system of cultivation. This system was initiated about twenty-five or thirty years ago by the late Hon. George H. Greene, of Iandra Station, Grenfel district, New South Wales. He contracted with farmers and others without capital, men possessing a practical knowledge in the growth of crops, to plough the land, plant the seed, and harvest the crops; he, on his part, giving the use of the land free of rent, providing the seed wheat, and in some if not in all cases advancing the money to provide the necessary farming implements. It is also known to the writer that he was willing to lend the free use of young horses to those of the cultivators who cared to break them into harness. When harvested, the crop was shared in equal parts between the owner of the land and the cultivators. The system soon became general and rendered New South Wales the only State of the Commonwealth in a position to export a large surplus of wheat. Two crops of wheat in succession were thus taken off the same land, when the cultivators were moved on to another portion of virgin soil. The land from which the wheat crop had been taken was either allowed to return to indigenous grasses or planted with exotic grasses. If the former, it is well known to men of experience that the native pasture is greatly improved by the breaking up of the surface soil, and cattle and sheep always prefer it to pasture on undisturbed soil. It is not the object of the present writing to trace the effect that the share-system has had on the production of wheat in New South Wales, but to show the splendid opportunity the system offers for laying down in cultivated grasses large areas of land, thus greatly increasing its grazing capabilities, both for dairying purposes and for the fattening of stock, thus coming into line with other countries, such as New Zealand and Argentine, in fattening off cattle at early ages, and thus bringing the quality of our breef more in accordance with the requirements of our butchers and tastes of foreign meat consumers. In normal times there are always available plentiful supplies of store cattle from the larger inland grazing holdings, and farms of improved pasture could be very profitably used in the fattening of store stock. There are many excellent exotic fodder grasses that have taken kindly to the Queensland climate, among others, lucerne, Rhodes grass, Paspalum dilatatum, sheep Burnett, fescue, &c.; and the late Mr. F. M. Bailey, the veteran Government Botanist, pointed out many of our indigenous grasses which not only were of great value as fodder plants but which were greatly improved in their habits of growth and in quality by cultivation. The practice in Great Britain and other countries in the Northern Hemisphere, when laying down fields in pasture, is to sow the grass seeds with the wheat or oat crops, as the case may be; the cereal crop affording the necessary protection from the sun during their earlier growth. This could easily be carried out when sowing the second crop of wheat. This has the double advantage, in countries where straw forms an important item in cattle food, in rendering it more digestible and palatable for the stock. The experience of Queensland farmers who have experimented with Rhodes and other

grasses of rank growth will suggest to them whether they would be apt to overshadow the wheat crop before the latter arrives at maturity. That the cultivation of pastures would immensely increase our annual "cast" of fat cattle and sheep, in addition to improving the quality of the meat, will be regarded as a matter of course, and that it would largely increase the flow of milk in dairy herds is equally self-evident.

FEEDING AND MANAGEMENT OF MILCH GOATS.

Feeding is an important question, and naturally one is desirous of obtaining the best results combined with economy. Whether goats are kept tethered or running at large, the best fodder for hand feeding is prime lucerne chaff, and bran together with linseed meal and sweet potatoes, as a valuable addition to the diet, and to give variety.

If kept tied up, the ration should consist of the following proportions, to be given twice a day, morning and night, preferably at milking time, viz.:—Prime lucerne chaff, 2¼ lb.; bran, 3 single handfuls; linseed meal, half handful; sweet potatoes, cut up, 1 lb.

Note.—If the potatoes are given lessen the bran to half. The items mentioned should be mixed well, excepting the cut-up potatoes, which should be placed on top. A little green lucerne is good, but let it wilt for a day or two before feeding, as it might produce hoven otherwise.

It should be borne in mind that it will take nanny at least a fortnight to learn to feed properly, and until she does the yield will not increase.

Bran when made wet acts as an aperient, but when given dry it is a valuable food, so do not wet the bran, as it sours quickly.

Grain of any kind is too heating, and has the effect of putting them back with the milk yield, and if persisted in will dry them off, corn in particular. If a grass plot is available it is an excellent plan to tether them so that they can get a pick. If the available grass is small in area, it is better to cut or pull it, and put it in their manger. They are very fond of milk thistles.

If able to allow the goats their freedom, it is astonishing the variety and amount of food they will collect. Such being the case, the quantities of feed to be given when kept in captivity can be reduced to half or less, depending on the value of what they can find. The milk yield will help to determine this point. A good goat will keep in milk profitably for twelve months, or even longer, but it is not desirable to keep them in more than a year. If this end is to be attained they must be kept away from the buck.

The diet can always be supplemented by bits of bread, potato peelings, and waste from the kitchen, but all such waste must be

clean, else nanny will not eat it, nothwithstanding the assertion that they will thrive on jam tins and old boots. Certainly, they are very hardy, but most particular about what they eat.

It is necessary to have a shelter of some kind for them, as they do not like rain or damp places. Always have fresh drinking water on hand, and see that it is not soiled.

In selecting milkers it is best to see them milked before purchasing if possible. It is well to keep the following in mind, viz.—"It takes no more to feed a good animal than a bad one."

The Angora goat is of no value as a milker; the common goat is by far the best. A nanny that will give two quarts a day when just in must be considered an excellent milker.

Goats' milk will stand one-third it's own volume of added water, and will then be richer than ordinary cows' milk, and will be found quite the thing for all ordinary purposes.

THE STOMACH-WORM IN SHEEP.

By W. G. BROWN, Instructor in Sheep and Wool.

[CONTINUED FROM AUGUST NUMBER.]

Another set of experiments conducted by Dr. Theiler will have interest to most sheep farmers in Australia who are grazing sheep on infected country, the subject being—"What is the effect of dosing pregnant ewes?"

The sheep experimented upon were 4, 6, and 8 tooth sheep. The table showed some interesting results, but is too long for insertion here.

Thirty ewes in an advanced stage of pregnancy were dosed with various amounts of Cooper's dip and bluestone, and in only four cases were the lambs born dead. Three of these four cases showed twin lambs which died; the singleton died a few days after birth. Dr. Theiler's conclusions on the experiment are:—

"The dosing of pregnant ewes with the maximal safe dose of Cooper's dip and bluestone was followed, in two instances, by the death of the twins. This may be due to the actual dose, since in one other instance where the twins survived, the ewe had only been dosed with half the safe dose."

In regard to the use of arsenic in this matter, I met with a curious experience two years ago, at Emerald, in the Central district. A sheep farmer who had some 2,000 ewes about to lamb, informed me that he would like advice about them. Several days later I visited his farm, and, sure enough, found his sheep wormy, and also heavy in lamb. Knowing that ewes with lambs at foot may safely be drenched without injury to the lambs, I advised him to wait, and drench his ewes after

they lambed. He then said triumphantly, "I thought you would say that. I drenched them all two days ago." He used Pottier's dip and got good results. For several weeks I visited these sheep at regular intervals, and found in the end that the lambing was very successful. There is no doubt, however, that he took a big risk, and, in my opinion, an unnecessary one, for reasons stated above.

THE DOSING OF EWES WITH LAMBS AT FOOT.

This question also has interest for us, and another set of tables shows that the dosing of ewes with the maximal safe dose of Cooper's dip and bluestone had no ill effect on the lambs suckled by the dosed sheep.

This is in accordance with facts I have noticed in drenching ewes with the arsenical drench. Absolutely no ill effect on the lambs was to be observed after drenching the ewes with the full dose (2½ grains).

THE LICK.

"The second method of dosing sheep is by allowing them free access to a lick containing vermifuge ingredients. The danger of this method is, obviously, that sheep may get too much of the lick." Thus Dr. Theiler. My experience is that sheep, after the first day of two, only help themselves sparingly to the salt lick, whatever other ingredients are included.

Dr. Theiler's conclusions after the experiments are—"The free access of sheep to a lick containing Cooper's dip and bluestone for a period of three months, during which time one sheep consumed on an average daily 2·3 grains of Cooper's dip and 2·3 of bluestone, had no decisive effect on the worms. The sheep kept in good condition, but the controls which were not dosed showed exactly the same condition, so that no effect, whether good or bad, could be noticed in the sheep. This experiment should indicate that the method of allowing sheep to partake of vermifuge through the medium of a lick is by no means a method which can be considered to be preferable to the dosing of the sheep with the optimal doses."

Other drenches than Cooper's dip and bluestone were tried by Dr. Theiler, and from time to time I shall make extracts from his published conclusions on these. It is a matter of such importance to this country that all information should be searched for and spread broadcast. The pest is making headway fast in almost every district in Queensland, excepting the very far West. It is only reasonable to conclude that even there it is possible that once these parasites get a footing, as much loss and trouble will be caused by the parasite as in the closer settled areas nearer the coast. I know that they are in as dry areas as are to be found in Queensland, as at Alpha, Jericho, Augathella, Surat, Yeulba, &c., which are surely dry enough areas, yet worms are to be found a pest in these districts.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF JULY, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Noble Dot ...	Jersey	2 May, 1915	612	4·6	33·17	
Lady Twylish	,, ...	5 June ,,	562	4·7	31·14	
Netherton Belle	Ayrshire	23 April ,,	630	4·2	31·10	
Bluebelle ...	Jersey	20 June ,,	724	3·6	30·53	
Iron Plate ...	,, ...	21 Feb. ,,	466	5·4	29·75	
Miss Bell ...	,, ...	2 July ,,	514	4·2	25·38	
Lark ...	Ayrshire	17 June ,,	618	3·4	24·55	
Black Bess ...	Jersey	4 June ,,	471	4·2	23·23	
Lady Athol	Shorthorn... ...	29 May ,,	545	3·6	22·99	
Lady May ...	Ayrshire	7 Mar. ,,	513	3·6	21·64	
Lady Lil ...	Jersey	27 June ,,	410	4·2	20·23	
Cocoatina ...	,, ...	6 Mar. ,,	332	4·9	19·18	
Thornton's Fairetta	,, ...	27 Mar. ,,	325	4·7	18·0	
Lady Melba	Holstein	6 Mar., 1914	413	3·7	17·90	
Nellie II. ...	Shorthorn... ...	20 July ,,	428	3·5	17·52	
Miss Melba	Holstein	22 Nov. ,,	459	3·2	17·12	

The following cows were stall fed, in preparation for Brisbane Exhibition :—Noble Dot, Netherton Belle, Iron Plate, and Black Bess. The remainder of the herd grazed on natural pastures, supplemented by a ration of ensilage.

DRIED YEAST AS FOODSTUFF.

With the increased prices of imported concentrated foodstuffs, it is desirable that farmers should keep their eyes open for any new sources of suitable foods which may be available.

Such a food, according to an article appearing in the Journal of the Board of Agriculture, appears to be dried yeast.

In Germany it is estimated that the output of brewers' yeast is about 69,000 tons a year, a large proportion of which is subjected to the drying process and sold for stock feeding. The small quantity of dried yeast prepared in this country has been mainly exported to Germany, where the product has grown in favour so rapidly that the demand is said to have exceeded the supply. The high percentage of albuminoid in dried yeast is a feature to be noted. From various

analyses it appears to contain from 45 to 50 per cent. of this valuable constituent, and in this respect is only equalled amongst ordinary farm foods by decorticated seed meal or cake and soy bean meal and cake.

Feeding experiments with dried yeast have been carried out at Garforth, and the report on the results is of a distinctly favourable character.

It is, therefore, considered opportune by the Board of Agriculture that apart from the exceptional circumstances of the moment, the attention of the British farmer should be directed to this new feeding material, and especially that, if the claims as to its merits can be substantiated, every effort should be made to develop the home demand to such an extent as to render exportation in the future as unnecessary as it is undesirable.

According to the experience gained during the trials, the results were summarised as follows:—

1. Dried yeast has proved a safe food for cows, pigs, and calves.

2. For cows, dried yeast is not to be strongly recommended, since they show a special aversion to its bitter taste.

3. It has proved a good food for pigs, having given results markedly better than those obtained with an equal weight of wheat "sharps." Despite the increased cost of the ration on introducing dried yeast in the place of an equal weight of "sharps," the margin of profit on the feeding has been undoubtedly increased.

4. Dried yeast has proved a safe food for calves, but no evidence has been obtained as to its merits in comparison with other foodstuffs commonly used for calf-rearing.

5. Dried yeast keeps well, and on mixing with other meals and water may be kept for some time without objectionable fermentation taking place.

6. In arriving at these conclusions no account has been taken of the value imparted to the manurial excreta of the animals by the consumption of dried yeast. From its composition, this may be expected to be as high as that of any other foodstuff commonly used on the farm.

7. Although the experience with dried yeast at Garforth, as outlined above, has been favourable, there is no reason to believe, either from the results of experiments or from careful observation of the general health of the animals throughout the tests, that the dried yeast possesses special medicinal or dietic virtues which any other highly digestible food rich in albuminoids might not be expected to possess.

The Board of Agriculture would, no doubt, be ready and willing to supply information as to the best way of utilising the substance for stock-feeding purposes.—"Mark Lane Express."

The Orchard.

PINEAPPLE MEMOS.

C. F. BARKER, Barmundoo—

Following are replies to your questions:—

Q. 1. What is the average yield of pineapples per acre on fair to good pine land?

Q. 2. What is the average (about) gross profit per acre of pines under safe conditions?

A. 1 and 2. Returns fluctuate. £35 and £80 per acre. 10,000 to 12,000 pines not uncommon, say 10 to 15 tons per acre.

Q. 3. What labour is required? About how many acres can a man keep cleared, manured, and generally attended to?

Q. 4. Does this labour require to be kept at work regularly? In other words, does the planter employ the majority of his hands permanently or only at particular periods, say, when the cultivation requires cleaning or the fruit picking?

A. 3 and 4. Five to 10 acres or more. It depends on the man, nature of the soil, horse or hand labour. Labour may or may not be continuous if it is required to keep the plantation clean and for harvesting the crop.

Q. 5. What is the usual class of labour employed, and at what wages?

A. 5. Ordinary farm or garden hands at the ruling rate of wages for the district.

Q. 6. Is it your opinion that much experience is required to be successful at pinegrowing? What chance has a man without previous experience at fruit-growing of making a success at pine cultivation?

A. 6. No. A good cultivation has a splendid chance.

Q. 7. Is it customary or beneficial to grow other fruits with pines?

A. 7. Ground crops, such as peas, beans, tomatoes, &c., may be grown between the rows for the first year or two, but fertilisers must be used to prevent the pines being robbed of any sustenance.

Q. 8. Does disease frequently destroy a whole crop of pines?

A. 8. No.

Q. 9. Is it your opinion that we are likely to over-produce pines?

A. 9. No.

Q. 10. Could you recommend me any books on pineapple culture?

A. 10. We have no other literature in this connection.

Botany.

LIST OF FRUIT TREES SUITABLE FOR NORTHERN QUEENSLAND.

(Does not include those already commonly grown for the market.)

Alligator Pear
Breadfruit
Jack Fruit
Chinese Raisin
Litchi
Mangosteen
Sapodilla Plum
Star Apple
Vi Apple
Wampee
Rambutan
Butter Fruit or Mabola
Pulassan
Rose Apple
Brazilian Cherry

Most of the above could be obtained from Singapore.

J. F. BAILEY,
Colonial Botanist.

LIST OF ORNAMENTAL TREES SUITABLE FOR NORTHERN QUEENSLAND.

Exotics.

Albizzio fastigiata, A. Forbesi, A. stipulata.

Bauhinia Candida, B. purpurea, B. splendens, B. variegata.

Cassia fistula (Indian Laburnum), C. nodosa (Golden Chain), C. siamea.

Caesalpinia ferrea

Cinnamomum Camphora (Camphor).

Erythrina caffra, E. indica, E. speciosa (Coral trees).

Ficus benjamina (Weeping Fig).

Harpephyllum caffrum (Natal Plum).

Jacaranda mimosæfolia.

Kigelia pinnata (Sacred Bean of Nubia).

Myrospermum pereirae (Balsam of Peru).

Poinciana regia (Flamboyant Tree).

Natives.

Acacias (a number of species).

Bauhinia Hookeri (Queensland Ebony).

Buckinghamia celsissima.

Castanospermum australe (Moreton Bay Chestnut).

Cupania pseudorhus.

Cypress Pine.

Grevillea robusta (Silky Oak) and other species.

Harpullia pendula (Tulip wood).

Stenocarpus sinuayus (Wheel of Fire).

Sterculia acerifolia (Flame Tree) and other species.

The above list includes those which can be purchased at nurseries within the State, otherwise there are numerous other trees which could be recommended.

Science.

AIR IN THE SOIL AND EARTHWORMS.

By BENJAMIN WILSON.

Loose soil is a mixture of (1) solid constituents, (2) water, (3) air. It is the last named that we will deal with. Air in the soil is a most important point not considered by many people, though it is absolutely necessary to the successful growth of the crops. All living subterranean parts, like all other living parts, require air (oxygen) for breathing. Only such plants as have large air spaces, connected by passages, can thrive in soil deficient in air—for instance, in very wet soil where the ground water is at the surface. All other plants would die through suffocation. The reason for this is that alcoholic fermentation and the evolution of carbon dioxide is set up, with the inevitable result of death and putrefaction. In soils poor in oxygen, decomposition takes place in a totally different manner from that in aerated soils; humic acids are formed in great quantities, so that the soil becomes sour. Air in the soil differs slightly in composition from that in the atmosphere; it contains more carbon dioxide and less oxygen, particularly so in the subsoil, because of the respiration of subterranean organs, bacteria and animals, and the decomposition of organic bodies. The amount of carbon dioxide varies with the quantity of organic matter in the soil, the crop, the method of cultivation, the contour and humidity of the land, the size of the soil particles, the depth of soil, and the temperature (season).

The aeration of soil depends essentially upon the structure; the more porous and loose the soil is the more complete is the aeration. Natural factors and artificial factors (cultivation) that assist this aeration are many and varied. As these factors are almost universally known, we need not mention them. One natural factor, however, that has a great connection with aeration, and to which the average person is not inclined to place much credit, is the earthworm. Earthworms play special roles in ordinary soil. The role that concerns us here is: By the tunnelling carried out, and the passages made, due to their activity, they render the soil more porous and better aerated. In other words, the soil becomes mellow, thus promoting breathing in the roots and, consequently, growth in the crops. The excrement deposited likewise serves to render the soil more pliable and porous. They also facilitate drainage. The effect of these animals will be patent to anyone if he can realise that it has been calculated that there may be as many as 400,000 in 2½ acres of land. By admitting air to the soil, more plant food is made available, the soil is made warmer, drainage assisted, the soil broken up, breathing promoted, and in fact a large number of definite advantages arising from admitting air, and which will be seen by anyone who pays a little attention to the matter.

Entomology.

EXPERIMENTS IN THE DESTRUCTION OF THE CANE BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

As a result of certain field experiments conducted during November and December last, acetylene light was proved to be very attractive to both sexes of our principal cane beetles throughout their aerial existence, such reaction, however, being considerably influenced by various meteorological and other conditions.

The movements of the beetles whilst flying near artificial light were studied, particularly their manner of approaching the trap and behaviour when within a foot or so of the flame; and certain conclusions were arrived at regarding the kind of design most likely to produce a serviceable light trap, and the conditions under which the latter might be expected to yield payable results. As an outcome of these observations, it is proposed to construct an entirely new form of trap for trial during the coming season. Such contrivances usually aim at capturing the insects by means of a shallow tray or pan containing water and kerosene placed under a strong lamp. This principle, however, is not to be commended in the present instance for the following reasons. In the first place, it entails needless labour and expense, which, although small, would nevertheless be appreciable when dealing with a number of traps. Secondly, it would destroy a certain proportion of useful insects, both parasitic and predaceous, which help to control not only the cane beetle in question but a number of other insects pests of sugar cane.

In this connection I may mention that a well-known enemy of cane grubs (*Dielis formosus*), the common "Digger Wasp," and probably beneficial cockroach (*Ellipsidion pellucidus*, Brunn.) which frequents the foliage of sugar cane, are susceptible to the influence of artificial light. An arboreal species of earwig also, which I believe to be predaceous on small lepidopterous larvæ of at least one of our cane pests, is attracted in great numbers.

The grey-backed cockchafer (*Lepidiota alborhirta*) responds to the stimulus induced by acetylene light from a considerable distance, the phototropic influence being well-nigh irresistible, and compelling this insect to advance towards the trap. It rarely flies directly into the flame, but when within a few yards approaches in an erratic manner by a series of short flights, settling at brief intervals on the ground or on cane plants, and finally, as though struggling against the attractive force, plunging headlong downwards at a distance of about a foot or eighteen inches from the light. Our new trap will be fitted with a landing stage

designed to take advantage of the above habit and immediately capture all beetles that may settle or fall upon it and deposit them in a large chamber from which return will be impossible. Suitable exits will, of course, be provided for useful insects such as carabidæ (predaceous ground beetles) and the various hymenopterous parasites.

The light will be protected in such manner as to throw beetles that may attempt to dash into it on to the stage below, to their certain doom, but at the same time prevent the destruction of beneficial species.

By making use of a discovery relating to a peculiar habit connected with the flight of this insect when taking to wing, it will be a simple matter to prevent cane beetles from flying out of the trap.

Recent experiments with regard to the control of *Lepidiota albohirta* whilst in its larval form have for the most part given negative results, but although apparently inconclusive such work in reality serves a useful purpose by directing investigations into more and still more promising channels which, owing to this gradual process of contraction, must eventually come to focus somewhere, and in all probability reveal a pathway to discoveries of decided economic value.

Whilst stationed at Gordonvale, I have sought to embrace present opportunities for studying the life-history and economy of many insect pests of sugar cane, the majority of which, although of minor importance, include a few decidedly injurious species and several hitherto undescribed forms. Such knowledge is essential to a comprehensive survey of the cane-grub problem, it being, of course, quite possible to advocate control methods that, whilst successful against one kind of pest, may destroy certain natural enemies of another, and so tend to favour an abnormal increase of the latter species.

OIL OF GERANIUM.

Essential oil of geranium is the product of the steam distillation of the leaves and flower of species of pelargonium (*n. o.* Geraniaceæ).

French oil of geranium is obtained from *P. radula,* Algerian oil from *P. roseum* and *P. odoratissimum.*

Various forms of still are used, and inquirers are referred for particulars of these to works dealing specially with the subject of essential oil distillation. Brant's "Practical Treatise on Animal and Vegetable Fats and Oils" may be consulted.

Essential oil of geranium prior to the present war was quoted at from 15s. to 30 per lb. for various grades, the value being based, probably, on geraniol content.

It is pointed out that no operation of essential oil extraction upon a small scale can be expected to compete successfully in the production of an oil which forms the product of a specialised industry in other parts of the world.

General Notes.

A NEW USE FOR PRICKLY-PEAR.

The American Consul in Uruguay says that, when travelling through certain parts, one's attention is attracted to the fine white colour of the farm buildings, even during the wet season. To obtain this neat effect a whitewash is used which is made from the sliced "leaves" of the prickly-pear, macerated in water for twenty-four hours, producing a solution of creamy consistence. To this lime is added and well mixed. When applied to any surface, be it wood, brick, iron, or other material, a beautiful pearly white appearance is produced, which will endure through storms and frosts for many years.

SPLIT PEAS.

"Woodford Marrow" and "Prizetaker" are used for split peas. They should be planted in drills like other peas, and should be sown as a winter crop, say from May to July, and reaped in Spring, before the heat is too great.

CUBIC CONTENTS OF A TANK.

A correspondent at Yelarbon sends the following dimensions of a tank—Top, 107 ft. by 61 ft.; bottom, 68 ft. by 36 ft.; depth, 8 ft.—and asks for the cubic content. Mr. A. Morry, surveyor to the Department, advises as follows:—

" The Prismoidal formula is—Add together the area of the top and bottom, and four times the middle area. Then divide the whole by six, which gives the mean area. Then divide by 27, which gives cubic yards. In this case the following is the result:—

$$\begin{aligned}
\text{Area of top} &= 107 \times 61 &&= 6{,}527{\cdot}0\\
\text{Area of bottom} &= 68 \times 36 &&= 2{,}488{\cdot}0\\
\text{4 times area of middle} &= 876 \times 48{\cdot}6 &&= 16{,}878{\cdot}0\\
& && 6\overline{)25{,}853{\cdot}0}\\
& && 4308{\cdot}10 = \text{mean area in superficial feet.}
\end{aligned}$$

Then 4308·10 sup. feet × 8 (the depth) and divided by 27 gives $1276\frac{2}{3}$ cubic yards.

Note.—The middle area is obtained by adding together the length at top and bottom and dividing by 2, and the width at top and bottom, also divided by two. Then multiply the two results together—

$$\begin{array}{rr}
107 & 61\\
65 & 36\\
2\overline{)175} & 2\overline{)97}\\
\end{array}$$

$$87{\cdot}6 \times 48{\cdot}6 = \text{the middle area.}$$

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR AUGUST, 1915.

Article.		AUGUST. Prices.
Bacon	lb.	11d. to 1s. 0½d.
Bran	ton	£9 10s.
Broom Millet	„	£37 to £40
Butter	cwt.	156s.
Chaff, Mixed	ton	£11 5s. to £13
Chaff, Oaten	„	£13 3s.
Chaff, Lucerne	„	£17 to £17 10s.
Chaff, Wheaten	„	£4 10s. to £5 5s.
Cheese	lb.	11d. to 11½d.
Flour	ton	£20 5s.
Hams	lb.	1s. to 1s. 1½d.
Hay, Oaten	ton	£12 10s.
Hay, Lucerne	„	£6 to £7
Honey	lb.	3½d. to 4d.
Maize	bush.	4s. 10d to 5s. 3d.
Oats	„	6s. 6d.
Onions	ton	£10 10s.
Peanuts	lb.	3d. to 4d,
Pollard	ton	£9 10s.
Potatoes	„	£5 to £11
Potatoes (Sweet)	cwt.	1s. 9d. to 5s. 10d.
Pumpkins	ton	£4 15s. to £5 15s.
Eggs	doz.	11d. to 1s. 1d.
Fowls	pair	3s. 6d. to 5s. 6d.
Ducks, English	„	2s.6d. to 4s.
Ducks, Muscovy	„	4s. to 5s.
Geese	„	6s. to 7s.
Turkeys (Hens)	„	6s. 10d. to 7s. 6d.
Turkeys (Gobblers)	„	12s. to 15s.
Wheat	bush.	8s. 2d,

VEGETABLES.

Cabbages, per dozen	1s. to 3s. 6d.
Cauliflowers, per dozen	2s. to 7s. 6d.
Beans, per sugar bag	1s. 6d. to 3s. 6d.
Beetroot, per dozen bunches	6d. to 9d.
Carrots, per dozen bunches	9d. to 1s.
Chocos, per quarter-case	1s. 9d. to 2s. 6d.
Cucumbers, per dozen	...
Custard Marrows, per dozen	1s. 6d. to 4s. 6d.
Vegetable Marrows, per dozen	1s. 6d. to 4s. 6d.
Lettuce, per dozen	...
Peas, per sugar bag	1s. 9d. to 3s. 6d.
Celery, per dozen bunches	1s. 3d. to 1s. 6d.
Sweet Potatoes, per cwt.	4s.
Table Pumpkins, per cwt.	5s.
Tomatoes, per quarter-case	3s. to 6s. 9d.
Turnips, per dozen bunches	6d. to 9d.
Rhubarb, per bundle	1s. to 1s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	AUGUST. Prices.
Bananas (Queensland), per case	14s. to 18s.
Bananas (Fiji), per case	23s.
Bananas (G.M.), per case	22s. 6d. to 23s.
Mandarins, per case	3s. to 7s.
Oranges (Navel), per case	4s. 6d. to 6s.
Oranges (other), per case	3s. to 5s.
Passion Fruit, per quarter-case	2s. to 9s. 6d.
Lemons, per bushel case	3s. to 5s. 6d.
Papaw Apples, per half-case	...
Pineapples (Queens), per case	5s. to 8s.
Pineapples (Ripleys), per case	4s. to 4s. 6d.
Pineapples (Common), per case	4s. to 4s. 6d.
Strawberries (Queensland) per tray	3s. to 4s. 6d.
Tomatoes, per quarter-case	3s. to 8s.
Cucumbers, per case	6s. to 8s. 6d.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	AUGUST. Prices.
Apples (Tasmanian), per case	9s. to 10s. 6d.
Apples, Cooking, per case	6s. to 7s. 6d.
Bananas (Cavendish), per dozen	3d. to 4d.
Bananas (Sugar), per dozen	3½d. to 4d.
Cocoanuts, per sack	12s. to 15s.
Custard Apples, per quarter-case	4s. to 5s.
Granadillas, per quarter-case	...
Lemons (Lisbon), per case	4s. to 6s.
Limes (Choice), per quarter-case	2s. to 3s. 6d.
Mandarins, per half-case	2s. to 7s. 6d.
Oranges (Navel), per case	5s. 6d. to 6s. 6d.
Oranges (other), per case	3s. to 3s. 6d.
Papaw Apples, per quarter case	9d. to 2s. 6d.
Passion Fruit, per case	6s. to 9s.
Peanuts, per pound	3d. to 4d.
Rosellas, per sugar bag	...
Pineapples (Ripley), per dozen	1s. 3d. to 3s.
Pineapples (Rough), per dozen	6d. to 1s. 3d.
Pineapples (Smooth), per dozen	2s. 9d. to 3s.
Strawberries, per dozen pint boxes	3s. 6d. to 9s. 3d.
Strawberries, per tray	1s. 6d. to 2s.
Tomatoes, per quarter-case	2s. to 5s. 6d.

TOP PRICES, ENOGGERA YARDS, JULY, 1915.

Animal.	JULY. Prices.
Bullocks	£19 10s. to £21 12s. 6d.
Bullocks (single)	£31 10s.
Cows	£14 5s. to £17 5s.
Merino Wethers	40s.
Crossbred Wethers	51s. 3d.
Merino Ewes	36s.
Crossbred Ewes	46s. 6d.
Lambs	40s. 6d.
Pigs (Porkers)	45s.

LONDON QUOTATIONS.

London, 1st August.

Danish butter is quoted at 170/ to 174/ per cwt.

The market for frozen rabbits is steady and prices unchanged.

The Liverpool quotation for middling American cotton, August-September shipment, is 5·38d. per lb.

Jute, August shipment, from Calcutta, £23/10/ per ton.

Hemp, August-October shipment, £32.

Copra, South Sea, August-September shipment, £22/5/.

Raw linseed oil, spot pipes, £25 per ton.

Rubber, fine, hard Para, 2/4⅛ per lb.; plantation, first latex crepe, 2/5⅛; smoked sheet, 2/4⅞.

Hemp, sisal. No quotation owing to stoppage of shipments from Mexico. Probable from £38-£40 per ton.

Answers to Correspondents.

THE NUBIAN GOAT.

"ENQUIRER"—

We are informed that the Nubian goat is not at present obtainable in Queensland. You would have to import from Nubia, *viâ* Suakin, on the Red Sea, or Suez.

R. B. PORTER, Calbra.—

See reply to "Enquirer."

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

COMPUTED BY D. EGLINTON, F.R.A.S.

Date.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·4	5·33	5·30	5·47	4·59	6·4	4·46	6·27
2	6·3	5·33	5·29	5·48	4·58	6·4	4·46	6·28
3	6·2	5·34	5·28	5·48	4·58	6·5	4·46	6·28
4	6·1	5·34	5·27	5·49	4·57	6·6	4·46	6·29
5	6·0	5·35	5·26	5·49	4·57	6·6	4·46	6·29
6	5·59	5·35	5·25	5·50	4·56	6·7	4·46	6·30
7	5·58	5·36	5·24	5·50	4·55	6·8	4·46	6·30
8	5·57	5·36	5·23	5·51	4·54	6·9	4·47	6·31
9	5·56	5·37	5·22	5·51	4·53	6·10	4·47	6·32
10	5·55	5·37	5·21	5·52	4·53	6·11	4·47	6·33
11	5·53	5·38	5·20	5·52	4·52	6·11	4·47	6·34
12	5·52	5·38	5·19	5·53	4·51	6·12	4·47	6·35
13	5·50	5·38	5·18	5·53	4·51	6·12	4·48	6·36
14	5·49	5·39	5·17	5·54	4·50	6·13	4·48	6·36
15	5·48	5·39	5·16	5·54	4·50	6·14	4·48	6·37
16	5·46	5·40	5·15	5·55	4·49	6·15	4·49	6·38
17	5·45	5·40	5·14	5·55	4·49	6·16	4·49	6·38
18	5·44	5·41	5·13	5·56	4·48	6·16	4·50	6·39
19	5·43	5·41	5·12	5·56	4·48	6·17	4·50	6·39
20	5·42	5·42	5·11	5·57	4·48	6·18	4·51	6·40
21	5·41	5·42	5·10	5·57	4·48	6·19	4·51	6·40
22	5·40	5·43	5·9	5·58	4·47	6·20	4·52	6·41
23	5·39	5·43	5·8	5·58	4·47	6·21	4·52	6·41
24	5·37	5·44	5·7	5·59	4·47	6·21	4·53	6·41
25	5·36	5·44	5·6	5·59	4·47	6·22	4·53	6·42
26	5·35	5·45	5·5	6·0	4·47	6·23	4·54	6·42
27	5·33	5·45	5·4	6·0	4·47	6·24	4·54	6·42
28	5·32	5·46	5·3	6·1	4·47	6·25	4·55	6·43
29	5·31	5·46	5·2	6·1	4·47	6·26	4·55	6·43
30	5·30	5·47	5·1	6·2	4·47	6·27	4·56	6·44
31	...	...	5·0	6·3	...	...	4·56	6·44

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H. M.
2 Sept.	☽	Last Quarter	12 56 a.m.
9 „	●	New Moon	8 52 p.m.
16 „	☾	First Quarter	5 21 „
23 „	○	Full Moon	7 35 „

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 14th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

1 Oct.	☽	Last Quarter	7 44 p.m.
9 „	●	New Moon	7 42 a.m.
15 „	☾	First Quarter	11 51 p.m.
23 „	○	Full Moon	10 15 a.m.
31 „	☽	Last Quarter	2 39 p.m.

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

7 Nov.	●	New Moon	5 52 p.m.
14 „	☾	First Quarter	9 3 a.m.
22 „	○	Full Moon	3 36 „
30 „	☽	Last Quarter	8 10 „

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

7 Dec.	●	New Moon	4 3 a.m.
13 „	☾	First Quarter	9 38 p.m.
25 „	○	Full Moon	10 52 „
29 „	☽	Last Quarter	10 59 „

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October it will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1st December it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

Farm and Garden Notes for October.

FIELD.—With the advent of warmer weather and the consequent increase in the soil temperature, weeds will make great headway if not checked; therefore our advice for last month holds good with even greater force for the coming month. Earth up any crops which may require it, and keep the soil loose among them. Sow maize, sorghum, setaria, imphee, prairie grass, panicum, pumpkins, melons, cucumbers, marrows. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, and ginger. Coffee plants may be planted out. There are voluminous articles in previous journals giving full instructions how to manage coffee plants, from preparing the ground to harvesting the crop, to which our readers are referred. The planting of the sisal agave and the fourcroya may be proceeded with at any time of the year, but the best time is in spring and beginning of summer, when warm weather and good showers will enable the young plants to root quickly and become firmly established before the winter. The demand for the fibre is constantly increasing, and the supply does not nearly overtake the demand; hence prices keep high, and the outlook for the future is very promising. See our instructions in "The Sisal Industry in Queensland," obtainable free by intending planters on application to the Under Secretary, Department of Agriculture and Stock. Plant only on dry or well-drained soil. Cotton may still be sown.

KITCHEN GARDEN.—Our notes for this month will not vary much from those for September. Sowings may be made of all kinds of vegetables. We would not, however, advise the sowing of cauliflowers, as the hot season fast approaching will have a bad effect on their flowering. French beans, including butter beans, may be sown in all parts of the State. Lima and Madagascar beans should also be sown. Sow the dwarf Lima beans in rows 3 ft. apart with 18 in. between the plants. The kitchen garden should be deeply dug, and the soil reduced to a fine tilth. Give the plants plenty of room, both in sowing and transplanting, otherwise the plants will be drawn and worthless. Thin out melon and cucumber plants. Give plenty of water and mulch tomato plants planted out last month. Asparagus beds will require plentiful watering and a good top-dressing of short manure. See our instructions in "Market Gardening," obtainable on application to the Under Secretary, Department of Agriculture and Stock. Rosella seeds may be sown this month. No farm should be without rosellas. They are easily grown, they bear heavily, they make an excellent preserve, and are infinitely preferable to the mulberry for puddings. The bark supplies a splendid tough fibre for tying up plants. The fruit also makes a delicious wine.

FLOWER GARDEN.—The flower garden will now be showing the result of the care bestowed upon it during the past two months. The principal

work to be done this month is the raking and stirring of the beds, staking, shading, and watering. Annuals may be sown as directed for last month. Plant chrysanthemums, gladiolus and other bulbs, such as tuberose, crinum, ismene, amaryllis, pancratium, hermocallis, hippeastrum, dahlias, &c. Water seedlings well after planting, and shade for a few days. Roses should now be in full bloom. Keep free from aphis, and cut off all spent flowers. Get the lawn-mower out and keep the grass down. Hoe the borders well, and trim the grass edges.

Orchard Notes for October.

THE SOUTHERN COAST DISTRICTS.

As October is often a dry month throughout the greater part of the State, one of the most important duties of the fruit-grower is to keep his orchard or vineyard in a thorough state of cultivation, thus retaining the moisture in the soil that is essential to the setting and development of the fruit crop. As long as the land is level one cannot over-cultivate, as there is no danger of the soil washing, but when the orchard is on a hillside heavy thunderstorms, which may occur during the month, are very apt to cause heavy washaways of soil if the land is kept in the high state of tilth necessary to retain moisture. In this case the cultivation should always be across and not up and down the face of the hill, and where the soil is of such a nature that it will wash badly thin blocks, consisting of a row or two of a growing crop or of light timber, brushwood, or even a body of weeds or heavy mulching, should be provided, such blocks to follow the contour of the orchard. If dry, and water for irrigation is available, citrus trees will be the better for a thorough watering during the month. Give the trees a good soaking, and follow the irrigation by systematic cultivation, as this is much better than constant surface watering, as practised by the Chinese. Examine the orchard and vineyard carefully for pests of all kinds. When young trees are showing signs of scale insects, cyanide same; when leaf-eating insects of any kind are present, spray the plants that are being attacked with arsenate of lead. Look out carefully for black spot and oidium in grape vines, using Bordeaux mixture for the former and sulphur for the latter. When using sulphur, see that you get a fine sample—viz., one in which the particles of sulphur are in a very fine state, as the finer the sulphur the better the results. Do not apply the sulphur in the early morning, but during the heat of the day, as it is the sulphur fumes, not the sulphur, which do the good. A knapsack sulphurer is the best machine for applying sulphur to grape vines, trees, or plants.

Examine any late citrus fruits or early summer fruits for fruit-fly, and take every precaution to keep this great pest in check now, as, if

fought systematically now, it will not do anything like the same amount of damage later on as if neglected and allowed to increase unchecked. October is a good month for planting pineapples and bananas. Be sure and have the land properly prepared prior to planting, especially in the case of pineapples, as the deeper the land is worked and the better the state of tilth to which the surface soil is reduced the better the results, as I am satisfied that few crops will pay better for the extra work involved than pines.

TROPICAL COAST DISTRICTS.

As the fruit-fly usually becomes more numerous at this time of year, especial care must be taken to examine the fruit thoroughly prior to shipment, and to cull out all fruit that has been attacked by the fly. Banana and pineapple plants may be set out, and the orchards should be kept well tilled, so as to have the land clean and in good order before the heavy summer growth takes place.

All the spring crops of citrus fruits should be now marketed, and the trees, where necessary, should be pruned and sprayed, and the land be well ploughed. The ploughing should be followed by harrowing and cultivating, so as to get the surface of the land in good order. Granadillas and papaws should be shipped to the Southern markets, as, if care is taken in packing and they are sent in the cool chamber, they will carry in good order. These fruits should not be gathered in an immature condition, as, if so, they will never ripen up properly. They should be fully developed but not soft, and if gathered in this condition, carefully handled, and packed and shipped in cool storage, they will reach the Southern markets in good condition, and, once they become commonly known, will meet with a ready sale.

SOUTHERN AND CENTRAL TABLELANDS.

In the Stanthorpe district the spraying of apple, pear, and quince trees for codling moth will have to be carefully carried out, the best spray being arsenate of lead, of which there are several reliable brands on the market.

When fungus diseases, such as powdery mildew, &c., are also present, Bordeaux mixture should be combined with the arsenical spray.

The vineyard will require considerable attention, as the vines must be carefully disbudded, and any signs of oidium or black spot should be checked at once. Look out for late spring frosts, and, if possible, try the effect of smudge fires producing dense smoke for preventing any damage.

Keep the orchards and vineyards well cultivated, as it is of the utmost importance to keep the moisture in the soil at this time of the year if a good fruit crop is to be secured.

In the warmer districts cultivation is all-important, and when irrigation is available it should be used for both fruit trees and vines, a thorough soaking followed by systematic cultivation being given.

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Agriculture.

SOURCES OF PLANT FOOD.

By C. B. WELSH, F.R.H.S., Sunnybank.

Amongst those whose occupation consists in the intensive cultivation of the land, the question is constantly being asked, "How can I retain the complete fertility of the soil?" To those living near town, stable manure was a source of supply; but, with the rapidly increasing motor traffic, stable manure is fast becoming difficult to obtain in sufficient quantities. To the market gardener and fruit-grower it is not in many cases practicable or convenient to keep sufficient stock as a source of manure for his land; but manure the grower must have, or the fertility of his soil will soon be reduced and its cropping ability diminish.

Artificial fertilisers can be used to supply deficient plant foods, but they cannot supply humus, which forms the basis of all successful

manuring. The value of stable and farmyard manures—although they contain all the elements of a plant's nutrition (viz., nitrogen, potash, and phosphoric acid), in more or less available form—consists in the amount of humus they supply to the soil which they help to build up. Humus is not exactly a direct plant food, but it supplies the ideal rooting medium for plant life. By its decay all the constituents of plant food are rendered available and the plant is enabled to make a perfect growth. Humus possesses other available properties which must not be overlooked, for by its decay vegetable acids are formed which are powerful in attacking dormant plant food in the soil, and so bring it into a condition suitable for the plant to absorb.

Generally, peaty soils and fen land contain sufficient humus; but it is of such an acid nature that a good system of drainage must be adopted, and the addition of lime is required to sweeten it.

The physical effects of humus upon the texture and water-holding capacity of the soil are most important, for it has been proved that a soil containing a stock of humus has during a dry spell produced better yields of crops than a soil rich in fertilisers, but deficient in humus. The water-retaining capacity of a soil rich in humus is from three to four times greater than that of a soil devoid of humus.

If we were to treat a sandy soil with plentiful dressings of farmyard manure or organic matter, in time, instead of the soil running through the fingers as through a sieve, it would be moist enough to hold together in a little ball. Just the opposite action takes place when a stock of humus is built up in a heavy clay soil, for, in a short time, the heavy soil becomes porous and friable; it is easier to work, and is also warmer in winter and cooler in summer, or, I should say, a more uniform soil temperature is maintained.

Another good and necessary purpose humus serves is, to encourage life in the soil. A sterile or dead soil will produce nothing; we must have a living soil, for, if a soil is to be fertile, it must contain millions of living workers called "bacteria." These microscopic organisms play a most important part in the nutrition of plants, and much scientific study has been given to their action in the soil.

The chief object sought after in manuring is to increase the supply of food in a form in which it can be used to make inert plant food available, so that plants may produce their maximum yield of crops. Farmyard manure can only be classed as a slow manure, and some of the undigested residues will remain in the soil for a considerable time before they become available as plant food, and, were it not for the valuable humus which it goes to build up in the soil, it is questionable whether it would pay to use it when we consider the extra expensive labour involved in cartage and spreading.

When such crops as cabbage and cauliflower and crops for green feed as oats, barley, maize are being grown, and potash and phosphoric acid not lacking in the soil, I know of no better fertiliser to use than nitrate of soda for quick returns. It is simply marvellous the rapid action it has if applied, at the rate of ½ lb. to 20 square yards, or 1 to

2 cwt. to the acre, to young cabbage just prior to hearting, in and during showery weather, or before the crop is watered by means of irrigation; the cabbage will be ready for market two or three weeks earlier. Care should be taken when sowing nitrate of soda to prevent it lodging on the foliage of the plants, as it is injurious to the leaf tissues.

Nitrate of soda should not be used excessively on heavy soils, as, if repeatedly used year after year, it has a very injurious effect on the tilth of the soil, causing it to become sticky and cloggy in wet weather, and on becoming dry the soil sets hard on the crust. This deleterious action is not so apparent in sandy soils, but in such soils it should be used in small applications, because it must be remembered that nitrate of soda is water soluble and is immediately available for food; therefore, what the growing plant is unable to absorb is washed into the subsoil or drainage water and lost, as it is not retained by the soil.

For vegetable-growing, the soil can hardly be too rich, as the foliage and roots form the edible portion. Flowers obtain their colours from minerals in the soil, and it is a mistake to give excessive dressings of fresh farmyard manure, because it produces a rank growth, superfluity of foliage, and a coarse, loose flower. In flower cultivation, the object of attainment is a flower of substance, size, colour, and keeping qualities. At experiments carried out at the New Hampshire Agricultural Station, U.S.A., it was found in carnation culture that bonemeal gave the best results as regards the vigour and keeping quality of the cut blooms. Fowl manure, which is a rich organic manure, when used in excess, gave poor results and was distinctly harmful. Nitrate of soda was most unsatisfactory, as it produced flowers of poor colour and keeping qualities.

In seed-growing, it is usual to limit supplies of food, as by so doing a better quality of seed is produced. Many farmers have no doubt noticed that when a tree is ring-barked it produces an immense crop of seed just prior to its death; also, orange trees, when roots are attacked by rot, produce fruit containing much seed instead of the juicy and luscious product. If an unproductive apple tree, which has been making a surplus of rank growth, owing to excessively rich manuring, be root-pruned, it produces good crops of fruit. It seems to be one of Nature's laws that, if the supply of plant food is checked, the plant expends its energy in producing seed to supply the next generation of plants.

On the seed farms in England and Holland, noted for their supplies of pure, bright, plump seed, it is the usual practice, after selection, to transplant cabbage, cauliflower, root crops, &c., on to land in a good state of cultivation, but not recently manured, and there remain to produce their crop of seed. The best double stocks are grown in flower pots, the restricted root area promoting a better quality of seed. From these observations and facts, we may deduce that dressings of rich nitrogenous manures produce abundance of growth, which is what is required when the foliage is consumed as food. Well-decomposed manures, potash, and phosphoric acid develop the fruit and seed and a well-balanced growth.

A valuable source of manure to those situated where stable manure cannot be obtained, and stock is not kept, is the growing of green crops and ploughing them in. It is surprising what can be done to enrich poor soil in this manner; providing there is depth and easy cultivation, with a good rainfall, it is only a matter of time, and the soil can be built up and humus supplied, for it naturally follows that, as the very essence of food was taken out of the soil to build up the bodies of the plants which form the humus, they are full of nourishment and will, when decomposed, supply the growing generation of crops with the very properties required.

Suitable crops for green manuring are buckwheat, rape, cowpeas, lupins, vetches; the leguminous crops are the most valuable, because the bacteria which develop nodules upon the roots are able to collect the nitrogen from the atmosphere and store it up in the root nodules. All that is necessary in green manuring is to roll the crop, use a plough with a rolling coulter, attach a chain to the beam of the plough just long enough to reach under the mouldboard; as the plough moves along, the chain guides the green stuff under the mouldboard, and it is nicely covered. It is essential to plough under in wet or moist weather and well bury the crop. After ploughing, it is advisable to roll, as this consolidates the soil and excludes air, which hastens the decay of the green crop.

Foul land is quickly cleaned in this manner, as weeds are smothered and have no chance to seed, also the water-retaining capacity of the soil is increased as the store of humus is added to, and the texture of the soil greatly improved. A disadvantage is that more land must be cultivated to permit the time required to grow a green crop. On the ridges and orchards it is the custom to allow weeds to grow to prevent erosion during heavy storms. How much better would it be to grow, say, a crop of cowpeas which could be left to rot on the ground?

COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDENS.

ONIONS.

A rich light sandy loam is most favourable, but even more clayey loams may be used if limed before cultivation. The soil should be friable and contain plenty of humus or decaying vegetable matter, and must be well drained.

Stable manure should not be used immediately before planting onions, but preferably the year before. An excess of nitrogenous manure may also be injurious to the crop.

Apply per acre, according to the class of soil—

4 to 7 cwt. superphosphate,

1½ to 2 cwt. sulphate of potash or muriate of potash,

1½ to 2½ cwt. nitrolim or sulphate of ammonia,

or the same amounts in lb. to every 43 square yards.

A mixed fertiliser, containing about 7 per cent. of soluble phosphoric acid, 8 per cent. of potash and 4 per cent. of nitrogen, may be used in quantities from 7 to 12 cwt. per acre, or from 7 to 12 lb. per 43 square yards.

PARSNIPS.

This vegetable requires a rich sandy loam, which must be trenched or ploughed very deeply. An artificial fertiliser similar to the one given for carrots may be used, although the quantity of superphosphate may, with advantage, be slightly increased.

Apply per acre—

4 to 7 cwt. superphosphate;
¾ to 1½ cwt. sulphate of potash;
1½ to 2 cwt. nitrolim, or sulphate of ammonia.

PASTURE.

Ordinary pasture can be very much improved by the application of artificial fertilisers. In the case of lawns the use of fertilisers becomes imperative, and they are best applied before lawns are top-dressed.

Use, per acre, from 3 to 7 cwt. of a fertiliser, containing 4 to 5 per cent. of nitrogen, 6 to 7 per cent. of available phosphoric acid, and 8 per cent. of potash.

A good mixture for lawns is the following:—

1 cwt. fine bonemeal
1 cwt. superphosphate
1 cwt. nitrate of lime
1 cwt. muriate of potash } per acre.

or 4 lb. to 6 lb. of this mixture to every 43 square yards.

As a change the following mixture may be used alternately:—

3 cwt. Thomas phosphate
1 cwt. sulphate of potash
1 cwt. dried blood } per acre.

PEANUTS.

Peanuts do best on a fairly rich sandy loam, containing plenty of lime.

They may be grown between the rows in young orchards, and the leaves and stalk will give a valuable mulch.

Use a fertiliser containing 8 to 10 per cent. phosphoric acid, 10 per cent. potash and from 1 to 2 per cent. of nitrogen, in quantities up to 6 cwt. per acre, or the following mixture:—

2 to 3 cwt. superphosphate
1 to 1½ cwt. sulphate of potash
1 cwt. meatworks manure (with blood) } per acre.

PEAS.

Peas may be grown on almost any kind of soil, but do best on a fairly rich, sandy loam. The fertilisers already recommended for Cowpeas and also for beans may be used for peas.

POTATOES.

This crop has an extremely wide range, and can be grown almost all over Queensland. Deep, friable, sandy loams, with porous subsoils are most suitable. Heavy soils, and wet, sour, clay soils, must be avoided. The soil should contain a fair amount of humus, and for this reason, potatoes do particularly well in virgin soils. The land must be cultivated deeply.

Well-rotted farmyard manure is one of the best fertilisers for potatoes, and if the heavy amounts (10 to 20 tons per acre) are not available, even small amounts used in connection with artificial fertilisers will be found very beneficial. Potash is the principal constituent of all potato fertilisers.

A complete fertiliser for potatoes should contain 6 to 8 per cent. soluble phosphoric acid, 10 per cent. potash, and 3 per cent. of nitrogen, and should be used in accordance with the quality of the soil, in quantities from 5 to 10 cwt. per acre. It is often advisable to apply phosphoric acid and potash by itself, and the nitrogenous manure as a top-dressing later on.

The following mixed fertiliser can be recommended:—

2 to 4 cwt. superphosphate	per acre;
1 to 2 cwt. sulphate of potash	
1 to 1½ cwt. sulphate of ammonia, or nitrolim or nitrate of lime	

and if large amount of stable manure has been applied the amount of nitrogenous manure is cut down to one-half of the above quantity, and applied as a top-dressing at the time of blossoming, and in this case the quick-acting nitrate of lime is to be preferred.

In some cases muriate of potassium, or potassium chloride, gives better results than the sulphate.

RADISHES.

Radishes require a light rich garden loam, and the crop may be forced with artificial fertilisers, containing 8 per cent. soluble phosphoric acid, 10 per cent. potash and 3 per cent. nitrogen, used at the rate of 6 to 10 cwt. per acre, or 6 to 10 lb. per 43 square yards, or from 2 to 4 oz. per square yard.

The same manure as recommended for lettuce may be used.

SORGHUM.

Use the fertiliser recommended for corn.

SPINACH.

The use of well-rotted farmyard manure at the rate of 10 to 12 tons per acre, or 2 to 2½ cwt. for every 43 square yards, is particularly recommended. Lighter dressings of stable manure must be supplemented by artificial fertilisers.

Use, per acre, from 6 to 10 cwt. of a fertiliser containing 6 to 8 per cent. soluble phosphoric acid, 5 to 6 per cent. potash, and 2 per cent. of nitrogen, or use—

4 to 6 cwt. superphosphate 1 to 1½ cwt. sulphate of potash 1 to 2 cwt. nitrolim or nitrate of lime	per acre.

SUGAR-CANE.

Sugar-cane is grown on almost any kind of soil on our coastal country, but gives the best returns on our alluvial soils and scrub soils, rich in humus. The same crop is generally grown continuously for a great number of years, and requires therefore proper fertilising with large amounts of artificial manures, in order to maintain the fertility of the land.

Exhausted sugar lands may be worked up again, after lying idle for a few years and allowing lantana to grow, which acts as a very valuable green manure crop, accumulating more particularly large amounts of potash.

A complete fertiliser for sugar-cane should contain about 7 to 8 per cent. each of water soluble phosphoric acid, potash and nitrogen, and should be used at the rate of 4 to 6 cwt. per acre.

The following manuring mixtures can be used, instead of the ready-mixed fertiliser:—

(1.)	2 to 3 cwt. superphosphate 1 cwt. sulphate of potash 2 cwt. nitrolim or sulphate of ammonia	per acre.
(2.)	3 to 4 cwt. meatworks manure 1 to 1½ cwt. sulphate of potash 1½ cwt. nitrolim or sulphate of ammonia	per acre.
(3.)	2 to 3 cwt. superphosphate 1 to 1½ cwt. sulphate of potash 1 cwt. nitrolim 1 cwt. nitrate of lime	per acre,

the nitrate of lime to be applied as a top-dressing.

SWEET POTATOES.

Sweet potatoes require, like the ordinary potato, a deep sandy loam, with a well-drained subsoil, and the same manurial treatment.

The same applies to other root crops, yams, arrowroot, &c.

LIST OF DEALERS LICENSED UNDER "THE FERTILISERS ACT OF 1914," AND REGISTERED FERTILISERS FOR THE YEAR 1915.

Name of Dealer.	Address.	Fertiliser.	Registered Fertiliser Certified to Contain Percentage of:										
			Nitrogen as:					Phosphoric Acid as:				Fineness.	
			Nitrate.	Ammonia.	Blood.	Flesh, Offal, Bone.	Unspecified.	Water Soluble.	Citrate Soluble.	Total.	Potash.	Fine.	Coarse.
Associated Farmers of Queensland, Ltd.	Brisbane ..	Various brands of Fertilisers..	..	..	..	..	..	..	..	..	..	..	..
Australian Cooper Fertilisers, Ltd.	Toowoomba ..	Various brands of Fertilisers..	..	..	..	..	..	..	..	..	..	..	..
Australian Meat Export Company, Ltd.	Brisbane	A.M.E. Fertiliser	..	..	7·0		..	..	..	11·0	..	..	..
Ditto	..	ditto Dried Blood	..	..	12·2	..	..	..	..	..	..	..	..
Ditto	..	ditto Bone Meal	..	..	..	4·05	..	..	..	24·8	..	26	74
Ditto	Townsville ..	ditto Dried Blood	..	..	12·0	..	..	..	..	..	..	..	..
Ditto	..	ditto Fertiliser	..	..	5·5		..	..	..	18·5	..	..	..
Australian Sugar Coy., Ltd. ..	Mourilyan ..	T.C. Fertiliser	..	..	..	..	3·8	..	..	20·0	..	..	..
Bateman, A. E.	Stanthorpe ..	Hassell's Potato Manure No. 1	2·5	2·0	..	..	..	12	..	12	..	..	..
Ditto	..	ditto Lucerne Manure ..	..	..	..	..	..	10·5	..	17·3	..	..	..
Ditto	..	ditto Pea and Bean Manure	3·2	..	..	..	..	12	..	15	..	..	..
Ditto	..	ditto Maize and Cabbage Manure	2·5	..	..	..	..	15·75	..	16·75	..	..	..
Ditto	..	ditto No. 1 Superphosphate	..	..	..	..	..	17	·5	18	..	..	..
Ditto	..	ditto Tomato Manure (orchard)	2·38	..	..	·75	..	11·25	..	13·95	..	..	..
Baxter, H.	Maryborough ..	M over B (in diamond) Bonedust	..	..	..	3·5	..	..	..	25	..	..	..
Baynes Bros.	Brisbane	Baynes Brothers' Fertiliser ..	..	..	4·27		..	..	..	19·75	..	..	..
Beatty, T. S.	Mackay	Crown Brand Sulphate of Ammonia	..	20	..	..	..	..	..	..	..	..	..
Ditto	ditto	ditto Superphosphate	..	..	..	..	..	16	..	..	..	..	..

Ditto	ditto	ditto Sulphate of Potash									50		
Ditto	ditto	ditto Cane Manure		4·3				7			15		
Bergl Australia, Ltd.	Bowen	Dried Blood			12·05								
Biboorah Meat Export Coy.					5·69					17·5			
Birt and Co., Ltd.	Brisbane	Phœnix Fertiliser			4·5					18			
Ditto	ditto	ditto Dried Blood			12								
Borthwick and Sons, Ltd.	Brisbane	T. B. & S. (in diamond) Fertiliser			7·0					13			
Brisbane Gas Company	Brisbane	Sulphate of Ammonia		20·98									
Burdekin River Meat Preserving Company, Ltd.	Sellheim	Burdekin Fertiliser			3·3					17·44			
Burns, Philp, and Co., Ltd.	Cairns	T. B. & S. (in diamond) Fertiliser			6·0					12			
Campbell and Amos, Ltd.	Bundaberg	Runcorn Bonedust				4·25				21·85		50	50
Ditto		Shirley's 7-7-7		7				7			7		
Ditto		ditto Superphosphate						17					
Ditto		ditto No. 3		3·3				13			2		
Ditto		ditto No. 5		3·3				12			7		
Ditto		ditto No. 9		4·1				6·5			4		
Ditto		ditto Sulphate of Ammonia		20									
Ditto		ditto Nitrate of Soda	15·5										
Ditto		G.M.W.Q. Meatworks Fertiliser			6·6					13·1			
Central Q.M.E. Coy., Ltd.	Lake's Creek	Fitzroy Fertiliser			5·15			·13	8·88	16·94	·1		
Chappel, J. H.	Charters Towers	Q.M.F. Fertiliser			5					15			
John Cook and Co., Prop., Ltd.	Brisbane	Redbank Freez. W. Fertiliser			7·23				10·85	11·1			
Corser and Co., Ltd.	Maryborough	Shirley's A Bone Phosphate		·5						29·8			
Ditto		ditto Superphosphate						17					
Ditto		ditto No. 3 Fertiliser		3·3				13			2		
Ditto		ditto No. 5 Fertiliser		3·3				12			7		
Ditto		ditto 7-7-7 Fertiliser		7				7			7		
Ditto		ditto No. 9 Fertiliser		4·1				6·5			4		
Ditto		ditto No. 11 Fertiliser						11·4			7		
Croker, J.	Mackay	Hassell's No. 1 Cane Manure		7·7				7			7·7		
Ditto		Q.M.E. Fertiliser			6·03				14·76	15·81			
Ditto		Q.M.E. Dried Blood			12·08								
Ditto		Sulphate of Potash									53		
Ditto		Sulphate of Ammonia		21									
Ditto		Nitrate of Soda	15·5										
Ditto		Superphosphates						16·5					

LIST OF DEALERS LICENSED UNDER "THE FERTILISERS ACT OF 1914," AND REGISTERED FERTILISERS FOR THE YEAR 1915—*continued.*

Name of Dealer.	Address.	Fertiliser.	REGISTERED FERTILISER CERTIFIED TO CONTAIN PERCENTAGE OF:										
			Nitrogen as:					Phosphoric Acid as:				Fineness.	
			Nitrate.	Ammonia.	Blood.	Flesh, Offal, Bone.	Unspecified.	Water Soluble.	Citrate Soluble.	Total.	Potash.	Fine.	Coarse.
Croker, J.	Mackay	Shirley's 7-7-7	..	7	..	..	..	7	..	..	7	..	..
Ditto	..	Fitzroy Fertiliser	..	..	5·15		..	·13	8·88	16·94	·1	..	..
Dalgety and Co., Ltd.	Brisbane	Shirley's Superphosphate	..	..	..	..	..	17	..	..	..	..	..
Ditto	..	Hassell's A1 Superphosphate	..	..	..	..	..	16·5	·5	17·5	..	..	..
Ditto	..	M.R.C. Japanese Superphosphate	..	..	..	..	..	19·5	..	20·5	..	..	..
Ditto	..	M.L. (in diamond) Superphosphate	..	..	..	..	..	17	1	20	..	..	..
Ditto	..	Runcorn Bonedust	..	..	..	4	..	..	..	21·85	..	52	48
Darling Downs Co-operative Bacon Company, Ltd.	Willowburn	Bone and Blood	..	..	7·75		..	..	5·56	6·82	..	..	..
Decker and Co.	Eagle street, Brisbane	Hassell's Pineapple, Strawberry, and Banana Manure	3·5	3	..	..	..	10	..	10	..	..	..
Ditto	..	ditto Barley and Stone-fruit Manure	2·7	..	..	2·05	..	5·5	..	13·7	..	..	..
Ditto	..	ditto Orchardists' Manure	2·4	..	..	·73	..	11·25	..	13·95	..	..	..
Ditto	..	ditto Maize Manure	2·5	..	..	..	..	15·75	..	16·75	..	..	..
Ditto	..	ditto Lucerne Manure	..	..	..	..	..	10·5	..	17·30	..	..	..
Ditto	..	ditto No. 1 Superphosphate	..	..	..	..	..	16·5	·5	17·5	..	..	..
Ditto	..	ditto Pea and Bean Manure	3·2	..	..	..	..	12·0	..	15·0	..	..	..
Ditto	..	ditto Potato Manure	2·5	2·0	..	..	..	12·0	..	12·0	..	..	..
Early, Mrs. A. B.	Chermside	Q.M.E. Fertiliser	..	..	6·03		..	..	14·76	15·81	..	..	..
Ditto	..	Q.M.E. Dried Blood	..	..	12·08	..	..	..	..	..	..	..	..
Foggitt, Jones, and Co., Ltd.	Brisbane	"Oxley" Fertiliser	..	..	6·15	..	..	..	..	15·5	..	..	..
Francis, J. V.	Ipswich	*Bonemeal	..	..	..	2·72	..	..	..	25·8	..	30	70

Ditto	..	*Dried Blood	..	..	11·4	..	..	..	..	5·3	..	..	..
Gladstone Meatworks, Ltd.	Gladstone	G.M.W.Q. Fertiliser (cattle)	..	..	6·32		..	..	..	13·55	..	..	..
Ditto	..	ditto Fertiliser (sheep)	..	..	6·60		..	..	..	13·10	..	..	..
Gleeson, E.	Stanthorpe	Baynes Brothers' Fertiliser	..	..	4·27		..	..	17·3	19·75	..	..	..
Hacker, W.	Chermside	Redbank Fertiliser	..	..	7·23		..	..	10·85	11·10	..	..	..
Ditto	..	Q.M.E. Dried Blood	..	..	12·08	..	..	..	..	..	..	..	..
Ditto	..	Q.M.E. Fertiliser	..	..	6·03		..	..	14·76	15·81	..	..	..
Hamwood, W. E.	Toowoomba	Wattle Brand Bonemeal	..	..	..	2·8	..	..	..	19·0	..	35	65
Headrick, Ltd.	Cairns	Biboorah Fertiliser	..	..	4·88		..	..	..	13·57	..	..	..
Hutton, J. C., Prop., Ltd.	Brisbane	Hutton's Special Fertiliser	..	..	6·17		..	..	13·05	14·10	..	..	..
Jordan, C. F.	Aspley	Normanby Bonedust	..	..	..	3·8	..	..	..	24·2	..	59	41
Lawson, R. B., and Co.	Stanthorpe	Bonedust	..	..	..	3·7	..	..	..	21·9	..	..	..
Ditto	..	Shirley's No. 1 Superphosphate	..	..	..	..	..	..	..	16·5	..	..	..
Ditto	..	ditto No. 2 Fertiliser	..	1·6	..	..	..	15	..	..	1	..	..
Ditto	..	ditto No. 3 Fertiliser	..	3·3	..	..	..	13	..	..	2	..	..
Ditto	..	ditto No. 5 Fertiliser	..	3·3	..	..	..	12	..	..	7	..	..
Ditto	..	ditto No. 9 Fertiliser	..	4·1	..	..	..	6·5	..	..	4	..	..
Ditto	..	ditto No. 11 Fertiliser	..	..	..	..	..	11·4	..	..	7	..	..
Ditto	..	Sulphate of Potash	..	..	..	..	..	..	..	..	52	..	..
Ditto	..	Nitrate of Soda	15·5	..	..	..	..	..	..	..	..	..	..
Ditto	..	Sulphate of Ammonia	..	20	..	..	..	..	..	..	..	..	..
Ditto	..	Blood and Bone	..	..	5·5		..	..	..	12	..	..	..
Ditto	..	Bonedust	..	..	..	3·7	..	..	..	21·9	..	..	..
Mant, C. O.	Creek St., Brisbane	Alligator Creek Fertiliser	..	..	5·75		..	..	..	16·5	..	..	..
Ditto	..	Redbank Fertiliser	..	..	7·23		..	..	..	11·1	..	..	..
Nisbet, T. and Co.	Innisfail	Shirley's 7-7-7 Fertiliser	..	7	..	..	..	7	..	..	7	..	..
North Queensland Mortgage and Investment Co., Ltd.	Townsville	Q.M.E. Fertiliser	..	..	6·03		..	..	14·76	15·81	..	..	..
Ditto	..	Q.M.E. Dried Blood	..	..	12·08	..	..	..	..	..	..	..	..
Paul and Gray, Ltd.	Brisbane	Shirley's Superphosphate	..	..	..	..	..	17	..	..	..	..	..
Ditto	..	ditto No. 0 Fertiliser	..	2·5	..	..	..	..	9	13·7	6	..	..
Ditto	..	ditto No. 3 Fertiliser	..	3·3	..	..	..	13	..	..	2	..	..
Ditto	..	ditto No. 5 Fertiliser	..	3·3	..	..	..	12	..	..	7	..	..
Ditto	..	ditto No. 7 Fertiliser	..	1·6	..	..	..	11·4	..	..	1	..	..
Ditto	..	ditto No. 9 Fertiliser	..	4·1	..	..	..	6·5	..	..	4	..	..
Ditto	..	ditto No. 11 Fertiliser	..	..	..	..	..	11·4	..	..	7	..	..
Ditto	..	ditto No. 14 Fertiliser	..	2·5	..	..	..	5·5	..	14	6	..	..
Ditto	..	ditto No. 19 Fertiliser	..	4·1	..	..	..	4·1	..	11·4	2	..	..

LIST OF DEALERS LICENSED UNDER "THE FERTILISERS ACT OF 1914," AND REGISTERED FERTILISERS FOR THE YEAR 1915—*continued.*

Name of Dealer.	Address.	Fertilisers.	Registered Fertiliser certified to contain percentage of:										
			Nitrogen as:					Phosphoric Acid as:				Fineness.	
			Nitrate.	Ammonia.	Blood.	Flesh, Offal, Bone.	Unspecified.	Water Soluble.	Citrate Soluble.	Total.	Potash.	Fine.	Coarse.
Paul and Gray, Ltd.	Brisbane	Sulphate of Potash	..	..	..	..	..	..	..	..	52	..	..
Paxton, W. H., and Co. ..	Mackay	Various	..	..	..	..	..	..	..	..	..	..	..
Pinder, A. W.	Rockhampton ..	"P.B. 8" Fertiliser	..	..	..	1	..	10	..	19·4	..	..	..
Ditto	..	"P.B. 3" Fertiliser	..	..	..	·7	..	8·5	..	12·9	..	..	..
Ditto	..	"P.B. 5" Fertiliser	..	4	..	·3	..	5	..	12·8	..	..	..
Pohlmann, J. W.	Doolbi	Bonedust	..	..	..	3·09	..	..	..	24·65	..	60	40
Pressler, G. L.; and Grotherr, E. C.	ditto	Bonedust	..	..	..	2·77	..	..	..	25·10	..	72	28
Pumpfrey and Kyle	Nundah	Q.M.E. Fertiliser	..	..	6·03		..	..	14·76	15·81	..	..	..
Queensland Fertiliser Coy., Ltd.	Runcorn	Runcorn Bonedust	..	..	..	4·25	..	..	..	21·85	..	50	50
Queensland Fruitgrowers' Industrial Trading Society	Brisbane	Webster's Superphosphates ..	..	..	..	..	..	16	..	..	..	..	..
Ditto	..	Shirley's Superphosphate ..	..	..	..	..	..	17	..	..	..	..	..
Ditto	..	ditto No. 3 Fertiliser ..	..	3·3	..	..	..	13	..	..	2	..	..
Ditto	..	ditto No. 5 Fertiliser ..	..	3·3	..	..	..	12	..	..	7	..	..
Ditto	..	Sulphate of Potash	..	..	..	..	..	..	..	..	52	..	..
Ditto	..	Q.M.E. Dried Blood	..	..	12·08	..	..	..	..	..	..	..	..
Ditto	..	Q.M.E. Fertiliser	..	..	6·03		..	..	14·76	15·81	..	..	..
Ditto	..	Baynes Brothers' Fertiliser ..	..	..	4·27		..	..	..	19·75	..	..	..
Ditto	..	Runcorn Bonedust	..	..	4·25		..	..	..	21·85	..	52	48
Ditto	..	J. C. Hutton's Fertiliser ..	..	..	6·17		..	..	..	14·10	..	..	..
Ditto	..	Webster's Sulphate of Ammonia	..	20	..	..	..	..	..	..	..	..	..
Ditto	..	Webster's Sulphate of Potash	..	..	..	..	..	..	..	..	50	..	..
Queensland Meat Export and Agency Company, Ltd.	Brisbane	Q.M.E. Fertiliser	..	..	6·03		..	..	14·76	15·81	..	..	..

Ditto	..	Q.M.E. Dried Blood	..	..	12·08	..	..	..	..	..	..	..	..
Rosewarne (Queensland), Ltd.	Brisbane	Excel Brand Fertiliser	..	..	3·88		..	..	..	16·80	..	..	..
Searle. J., and Sons, Ltd. ..	Toowoomba ..	Wattle Brand Bonemeal	..	..	..	2·8	..	..	..	10	..	35	65
Ditto	..	Baynes Bros. Fertiliser	..	..	4·33		..	..	..	19·33	..	..	..
Taylor, C., and Co.	Brisbane	Shirley's Superphosphate	..	..	..	..	..	17	..	..	..	..	..
Ditto	..	ditto No. 3 Fertiliser	..	3·3	..	..	..	13	..	..	2	..	..
Ditto	..	ditto No. 5 Fertiliser	..	3·3	..	..	..	12	..	..	7	..	..
Ditto	..	Sulphate of Potash	..	..	..	..	..	..	..	..	52	..	..
Ditto	..	Mt. Lyall No. 1 Superphosphate	..	..	..	..	..	17	1	20	..	..	..
Ditto	..	Redbank Fertiliser	..	..	6·46		..	..	..	13	..	..	..
Torrens Creek Meat Export Company, Ltd.	Torrens Creek ..	T.C. Fertiliser	..	..	3·80		..	..	..	20	..	..	..
Trackson Brothers	Brisbane	Nitrolim	..	..	..	..	18	..	..	..	..	..	..
Ditto	..	Nitrate of Lime	13	..	..	..	..	..	..	..	..	..	..
Tytherleigh, J.	Woombye ..	Nitrolim	..	..	..	..	18	..	..	..	..	..	..
Ditto	..	Hutton's Fertiliser	..	..	6·17		..	..	13·05	14·10	..	..	..
Ditto	..	Shirley's Superphosphate ..	..	..	..	..	..	17	..	..	..	..	..
Ditto	..	Q.M.E. Fertiliser	..	..	6·03		..	..	14·76	15·81	..	..	..
Ditto	..	Q.M.E. Dried Blood	..	..	12·08	..	..	..	..	..	..	..	..
Walker, J. J., and Co. ..	Brisbane	Torrens Creek Fertiliser ..	..	..	4·40		..	..	..	16·47	..	..	..
Walsh and Co.	Toowoomba ..	Downs Bac. Co. Gen. Fertiliser	..	..	2·84		..	..	..	14·54	..	..	..
Ditto	..	Hutton's Fertiliser	..	..	6·17		..	..	13·05	14·10	..	..	..
Ditto	..	Shirley's No. 3 Fertiliser ..	..	3·3	..	..	..	13	..	..	2	..	..
Ditto	..	ditto No. 5 Fertiliser ..	..	3·3	..	..	..	12	..	..	7	..	..
Ditto	..	ditto No. 1 Superphosphate	..	..	..	..	..	17	..	..	..	..	..
Ditto	..	ditto No. 9	..	4.1	..	..	..	6·5	..	..	4	..	..
Ditto	..	Wattle Brand Bonemeal ..	..	..	..	2·8	..	..	..	19·0	..	35	65
Webster and Co., Ltd. ..	Brisbane	Crown Sulphate of Potash ..	..	..	..	..	..	..	..	..	50	..	..
Ditto	..	do. Superphosphate ..	..	..	..	..	..	16	..	..	..	..	..
Ditto	..	do. Sulphate of Ammonia	..	20	..	..	..	..	..	..	..	..	..
Whiteley, D.	Emu Park ..	Sulphate of Potash	..	..	..	..	..	..	..	..	52	..	..
Ditto	..	Sulphate of Ammonia ..	..	20	..	..	..	..	..	..	..	..	..
Ditto	..	Nitrate of Soda	15·5	..	..	..	..	..	..	..	..	..	..
Ditto	..	Shirley's No. 3 Fertiliser ..	..	3·3	..	..	..	13	..	..	2	..	..
Ditto	..	ditto No. 5 Fertiliser ..	..	3·3	..	..	..	12	..	..	7	..	..
Wood, T. H.	..	Bonemeal	..	..	..	4·07	..	..	..	24·2	..	50	50

CORN-GROWING CONTEST, 1914-1915.

Following is an example of the Record Chart that was kept by one of the competitors in the corn-growing competition held under the direction of the Department of Agriculture and Stock, which commenced in 1914 and terminated in 1915. Another competition has been arranged for the season 1915-1916 under the same conditions. This chart was kept by an energetic young farmer in the Crow's Nest district, and, had the season been favourable, no doubt his energy would have been rewarded. He has now enlisted in the military forces, so will not be a competitor on this occasion:—

PARTICULARS ABOUT THE PLOT AND ITS PREPARATION.

Nature of Soil—Light, loamy forest soil, between a light black and chocolate colour.

Nature of Subsoil—Sub-soil in places consists of a heavy yellow clay, while other parts are gravelly.

Situation of Plot—Plot runs over the summit of a spur of the range, and slopes to east, south, and west.

Previous Cultivation or History of Plot—Plot has never been cultivated or worked in any way before, and up to this year (1914) has been heavily timbered with green iron-bark saplings, also a fair quantity of dead timber. As a rule, it carries a fair weight of grass, and up to September, 1913, was open to stock. It was then fenced, and from then on was not trodden in any way.

When Preparation of Plot commenced—Preparation commenced on 10th day of August, 1914.

Was Manure applied?—No manure was applied.

How was the Plot Prepared? (Competitors here to state fully how, and when, and why each operation was carried out; the condition of the soil as to moisture and fineness at each stage of working, the implements used, depth of working, difficulties experienced, &c.)—According to general ideas concerning farming, my plot does not stand a very good chance of bringing me in the first prize, as the soil is too new and sour from not having been worked. During the first week we commenced clearing operations in extremely dry and hot weather, but ideal conditions for the work. We stumped out the green saplings with axe and mattock, and burnt out all dry trees and stumps. Having filled up all holes remaining after burning, we intended to wait for rain to make the soil easier to work.

After waiting some little time and still no rain, we came to the conclusion that there was none to come, so decided to break the ground up dry. Accordingly, on Monday, 10th August, 1915, we started ploughing operations with three horses and a Newl-Saunder's improved single-furrow disc plough. The soil worked better than we anticipated, the only fault being that the sods in places would break away right down to the subsoil, making a very uneven furrow for the plough wheel to run in on the following round, and also leaving the ploughed land in a very rough condition.

Of course, we struck the usual collection of roots, stumps, &c., which was only natural; but, as two men followed the plough all the time, any obstruction was soon removed. The only real trouble we encountered was caused by the uneven bed of the furrow, which I have already mentioned. The disc stood the shaking splendidly until, happening to strike a specially rough patch, one of the main bolts broke in halves. Just as luck would have it, we had not another bolt in the place that would fit; so we were completely euchred. We were not beaten, however. So pulling the disc out of the way, we hooked on to a heavy English iron plough, made for the purpose, and finished the field with that.

The ground then lay in that condition for about four months, with scarcely a drop of rain, certainly not enough to soften the clods. A succession of storms early in December, however, had the desired effect, and I got on to the land with the harrows. After six or seven harrowings, the clods broke up sufficiently to allow of cross-ploughing—again with the disc plough. Of course, this was much easier than breaking up, and very little difficulty was experienced. The continued dry, hot spell had one good effect in that it completely killed the roots of the grass which were assisting to bind the soil together, so that after a thorough saturation the clods broke up rather easily.

After cross-ploughing it was harrowed again half-a-dozen times, till the soil was, in a certain measure, fit for planting as regards fineness and moisture. Of course, after breaking up, the soil was in the roughest possible condition and absolutely parched. The depth of ploughing was 5 in. On cross-ploughing, the depth was 6 in., while the sods were now broken up into squares as it were, and beginning to crumble. The ground was fairly moist, but, on account of the rough, open condition, moisture was not retained.

When we commenced planting, parts of the field were in very fair condition, the soil having crumbled up splendidly, while other parts were still very rough. Of course, I claimed the best corner for my plot, and was not refused.

Heavy rain fell during planting operations, so that the condition of the plot as regards moisture can easily be judged.

The only difficulty experienced was in the covering. I reversed the two outside hoes of the scuffler and raised the back one. In this way, by driving the horse in the drill and keeping one of the sides hoes on each side of the drill, both threw the soil inwards and so covered the seed effectively. But in the rough places the clods would jam up around the hoes, making them skid, so that I was continually stopping to clean them. However, I got all the drills covered; and on the 26th December I harrowed the field, and from then on I have been watching the crop grow, and dreaming of what I will do when I win the prize.

PLANTING.

Condition of Soil as to Moisture at Planting—Corn planted immediately after 1·20 in. of rain had fallen, so that the ground was thoroughly moist.

How was the Seed Sown?—The land was drilled out and the seed planted by hand and covered with a scuffler.

Was any Fertiliser applied?—No.

Was Seed Planted Singly, or in Groups or Hills?—The seed was planted singly.

Distance between Plants or Hills—The seed was planted roughly about 1 foot apart.

Distance between Rows—The distance was not accurately measured, about 4 feet.

Direction of Rows (north and south, or east and west)—Rows planted east and west.

Date of Commencing Planting—Commenced planting on 23rd December, 1914.

Date of Finishing Planting—Finished planting on 24th December, 1914.

Depth of Planting—The seed was planted about 4 in. deep.

PROGRESS OBSERVATIONS.

Date of First Appearance of Young Plants—First plants appeared on 27th December, 1914.

Time taken before all Plants are up in Rows—All plants up in rows on 30th December—seven days.

Number of Blanks re-seeded—No blanks re-seeded, as corn came up splendidly.

How Cultivated (Competitor to give in the form of a diary full particulars of the operations adopted to break soil crusts, cut out weeds, and keep in moisture)—27th December: First plants showing though. 30th December: All plants up in rows and looking very healthy. 14th January: Rain came and washed some of the plants out—a calamity, as every stalk may count. 18th January: In walking over the plot to-day, I noticed that weeds were coming in places. In this matter the new ground has the advantage as, speaking comparatively, there are scarcely any weeds. However, the few that are there must come out, as the weather is very hot and the moisture soon goes. 19th January: Commenced scuffling to-day with a very bad horse. At other times when scuffling, I do not take much notice if I destroy a few plants, but this time when the horse treads on one of my stalks I feel almost as bad as if he trod on me. However, the soil falls apart splendidly and I am having no trouble in killing the weeds. 20th January: Scuffling finished and the result is a very satisfactory job, in my opinion. Plants are now about 2 ft. high and growing exceptionally quickly. 27th January: Still growing, but beginning to look very bad during the heat of the day. My visions of the first prize are also becoming very dim. The worst part of it is that nothing can be done to improve matters, as there is not a weed to be seen anywhere and the soil is nice and loose. 4th February: In walking over the plot to-day, I noticed that the Early Leeming maize appears to be bad for suckers, as my

plot is thick with them, while 90-Day maize near at hand is entirely free. Otherwise the two varieties appear much the same so far. 8th February: First tassels noticed to-day, and the weather is horribly dry. In spite of this, corn is about 5 ft. high, but very withered. Pulled all the suckers from plot to-day to allow the main stalks all the moisture possible. 4 p.m.: Hopes reviving, as storm clouds appear in the west. A good downpour now will make a vast difference. 9th February: The first prize again appears before me. Smart storm yesterday evening, and good steady rain all to-day; in all about 3½ in. fell. This will do a world of good. 20th February: Several more light showers to-day. Corn is beginning to show cobs, but these light showers don't last long. We want another good soaking rain to produce proper growth. There appears no chance of this, however. 28th February: Getting very downhearted again. Dry, dry, dry—everything is dry—myself included. Corn withering again. 2nd March: Calamity altogether. Dreadfully hot day with scorching south-westerly winds and dust storms. Another day like this and I am ruined, or, rather, my chances of the prize are.

Weather Conditions during Early Growth—The weather conditions during early growth have been absolutely bad, no rain having fallen since plants were a fortnight old. They are now six weeks old, and are having extremely hot, dry weather, which causes the leaves to curl up completely during the heat of the day.

Date of First Appearance of Tasselling—First tassels noticed Monday, 8th February, 1915.

Weather Conditions during Tasselling and afterwards when Cobs are Forming—Just as the first tassels appeared—*i.e.*, on the 8th—we had good rain; but then it was dry and hot again, so that the cobs did not make proper growth. Rain fell again on the 5th March, however, which improved things considerably.

Was Plot Watered other than by Rain?—No; plot depended entirely on rain for moisture.

WOMEN IN AGRICULTURE.

The enrolment of a female student at the Dookie Agricultural College, with the report of the principal, Mr. Hugh Pye, to his council in regard to the innovation, raises an interesting and important question. A change is indicated in the relationship of women to agriculture, and, like every other change, it will be looked upon with both approval and condemnation by different observers. The development of modern conditions of life has greatly widened and changed the sphere of women's industrial and business activity, and, whether we approve of the change or not, it is important for us to recognise it and observe the direction of its tendency. When agriculture is compared with the other industries into which women are entering with increasing energy, little can be discerned in it that is calculated to preserve it as an exclusive sphere for men's occupation. As a matter of fact, there are many aspects of it

specially suitable for women, and there is nothing surprising in the fact that it should be invaded by the forces of the modern movement. In reality the invasion has been proceeding for a considerable time, and has already assumed considerable dimensions. Not much can be done to stop movements of this kind, even when it is desirable to do so. In this case there is little evidence that a larger participation in the agricultural industries would not be to the advantage of agriculture as well as of the general condition of society.

To understand what is new in this modern innovation it is necessary to remember that agriculture or farming consists of many widely varying branches. It not only embraces numerous differing branches connected with the cultivation of various crops and the keeping of different classes of live stock, but, like other industries, it must be considered in two aspects—viz., in regard to the work or labour involved, and in regard to the skill or knowledge employed in its management or direction. There are "farmers" and "farm labourers," and it is well to observe which of these two classes is meant when women are spoken of as engaging in agricultural occupations. Are they becoming occupiers and managers of farms, orchards, and vineyards, or are they serving as labourers on such places? There is surely nothing new in women engaging in farm work. They have in the past always taken an important part in the work of the field, of the farmyard, of the byre, and the dairy, as well as the orchard and the vineyard. As a matter of fact, modern progress has been in the direction of decreasing the proportion of female labour in agriculture, and in new countries like Australia, Canada, and the United States the almost entire absence of women from the fields is a marked feature of their newness. The new movement, therefore, cannot be a proposal for women to undertake farm labour. There are departments of farm work which are in their nature unsuitable for women. These have rarely been allotted to female labourers, and the new movement surely does not propose a backward step in this direction. This brings us back to the Dookie student, who has given rise to the discussion, "What is she doing?" She is certainly not preparing to be a farm labourer. It is not necessary to study the rudiments of the sciences upon which agriculture is founded in order to be a farm labourer. She is manifestly learning to be a "farmer"—to manage farm property and direct labour. If with the male students she works on the farm, it is not because she expects to have to do all branches of farm work herself when she becomes a farmer, but because, like the male students, she may know how to direct farm labourers. It is in aiming at being a "farmer," an "agriculturist," that this student is doing anything out of the common, and here we have the real nature of the innovation. What claims have women to be considered fit for assuming the position of farmers or managers of agricultural enterprises?

If we look at agriculture in its normal condition, as it has been conducted in the long past, and not in its changing modern phases, the part taken by women is found to have been by no means an unimportant one. The farmer has been assisted in his industry by his wife and his

daughters as well as by his sons. It has to be remembered that a farm is a home as well as an establishment for providing the means of living, and the home has always been an important department. Neither have modern developments decreased the essential value of the home department. There has certainly been evolved in the pioneering stages of agriculture in the new countries of America and Australia a crude type of producing centres, where wheat or live stock are raised under a rough and temporary system of exploitation. These, however, are not "farms," and the systems adopted are not farming. They are "camps," "ranches," or "stations," and they have to be followed in the course of progress by farms on which the homes must take their essential position of importance. When the relation of the home to the prosperity of farming is considered, it is realised that women have always been vitally associated with agriculture, and it is further manifest that farming, more than any other industry, is dependent upon woman's work and her special services. Modern changes have seen women invading many spheres in which the duties could be performed at least as well by men, but the case is different in relation to agriculture. A withdrawal of the part which woman has hitherto taken in farming would evidently be fatal to the industry, however well she could be spared from other spheres of business or occupation. It may, therefore, be in the interest of farming if women are now seeking to assume a larger share in the conduct of the industry.

But, before considering woman's fitness for a wider sphere of agricultural duties, it may be well to reflect upon the effect which is being produced upon the industry by other features of modern developments. Those tendencies which have produced the great cities and towns of the industrial age have, in all progressive countries, brought about a serious depletion of rural population. "Back to the land" is a cry which, for more than a generation, has voiced the suffering of agriculture by the loss of its producing population. Statesmen are agreed that one of the greatest needs for the accomplishment of permanent prosperity is an increase of primary production. This need is recognised in this country as clearly as in other parts of the world. While opinions differ as to the means by which primary production can be increased, no one disputes the vital importance of the object itself. In studying the causes and the remedies of rural depopulation, attention is too much confined to industrial or financial factors, and insufficient weight is attached to social influences. The effect upon this problem of the attitude which women have assumed towards agriculture and rural life has been more potent than has been recognised. What are the views of city girls in regard to marrying a farmer? The question is easily answered. It is not his income that is objected to, but the life such a marriage involves. If the city girl were willing to become a farmer's wife, what kind of a wife would she make? That question is also easily answered. It is evident that the young farmer would do well to marry his neighbour's daughter. But where is the neighbour's daughter? Perhaps whenever she left school she emigrated to the city. She, in fact, is probably one of those

city girls who decline to marry a farmer. As we have seen that the home is an essential part of the farm, with what difficulty farming and primary production are to be promoted until some important social changes are brought about. It may be that the movement suggested by the Dookie student under notice is the beginning of those necessary social changes.

If we inquire how far the part played by woman in agriculture hitherto suggests fitness for the leading rôle now being assumed, there is much to encourage expectation. Farmers' wives, as managers of the important home department, have been called upon to exercise many of those functions which have to be applied to the other branches of the farm—foresight, economy, industry, patience, skill, judgment in buying and selling. Have not farmers' wives displayed, as a rule, these qualities in the management of the house, the dairy, and the poultry yard as successfully as the farmer has done in the department under his direction? It may even be claimed that the farmer would have been more successful if his operations had been to a greater extent governed by the principles of "domestic economy." It has often happened that the head of a farming family has been prematurely removed, and the mother has had to assume the management in his place; but how seldom has she failed? It is difficult, indeed, to point out any feminine quality which is a disqualification for the management and direction of agricultural industries. Certainly there are departments of farm labour which are not suitable for women, but there are also departments of farming quite unsuitable for men—viz., those undertaken by farmers' wives. It is the directorship that women now proposes to assume, and it is difficult to deny her qualifications. It is likely, therefore, that women students at agricultural colleges will increase, and not improbable that the agricultural college in England for training girls will have its imitators. One result may be the elevation of agriculture and rural life in the estimation of young women, and than this nothing could do more to check the drift of agricultural population to the cities and bring about the necessary increase in primary production.—"Australian Farm and Home."

THE QUEENSLAND COTTON CROP OF 1914-15.

In connection with the cotton crop for this year, it is the intention of the Minister of Agriculture to take in hand the treatment of the crop in the same manner as was done last year, that is to say, that the Department will advance 1¾d. per lb. on the raw cotton, and afterwards sell the cotton and seed and distribute the profits amongst the suppliers. The Department will not make any charge for the work, but will deduct

any expense incurred in obtaining additional labour. Last season there was a small crop (9,445 lb. of seed cotton) which, when treated at the ginning house established at the Department of Agriculture, resulted in a yield of ginned cotton which, after all expenses were paid, enabled the Department to distribute an additional return over and above the 1½d. per lb. advanced to suppliers. It would be well if farmers would realise that cotton is a drought-resisting plant, that it requires little cultivation after it has made a good stand; that, beyond the boll worm, which can be overcome by alternative rows of cotton with a few rows of maize (which the insect prefers to cotton bolls), no disease troubles it. Had there been large areas of cotton planted in the districts which have, in the first half of the year, suffered so severely from drought, the growers would have realised very fair profits, the American quotations for ginned cotton being now 7d. per lb. and likely to go higher. When the present war is over, and many more settlers come to this State, we shall probably see cotton-growing established on a firm basis.

At the time of the Civil War in the United States of America, when American cotton could not be obtained except through successful blockade runners, Queensland had a splendid opportunity, and cotton was largely grown for several years, the farmers receiving 3d. per lb. for good seed cotton. Now 1,000 lb. of seed cotton (Uplands) is an ordinary return per acre, and as much as 1,500 and 2,000 lb. have been picked per acre in Queensland. How does a crop of 1,000 lb. of cotton compare with a 40-bushel crop of maize? In normal seasons, when good crops of maize are harvested, the average price per bushel may be put at 3s. 6d. to 4s., which is £8 per acre. The 1,000 lb. of cotton at 2d. per lb. amounts to £8 6s. 8d. per acre. But the cost of harvesting the crops has to be taken into consideration, when we come to reckon the profit. Maize has to be pulled, husked, threshed, winnowed, and bagged. Cotton has to be picked, sunned for a few hours, and bagged. In both cases white labour is employed. Cotton-growing in this State is a white man's job. If he has a family, he need employ no outside labour to pick it, which means ½d. per lb. saved to the farmer. Furthermore, in these days, the seed has a great value, which it had not in the sixties and seventies in Queensland. The seed which was then thrown out as useless, now brings from £4 to £6 per ton for oil and cake purposes. The 600 lb. of seed contained in a 1,000-lb. crop is worth from £1 to £1 10s. We have written so much about cotton-growing and its possibilities and certainties, that at the moment of writing we are wondering that many dairy farmers, who are to-day threatening to dry off their cows and give up dairying for the purpose of supplying the wants of cities, do not devote a few acres to a crop which will leave them a profit instead of what their present business shows, as they tell us, a dead loss. It is not

known how much will be sent in this season. It is believed that if the industry weathers the next year or two it may become more firmly established in Queensland, but, as is well known, the difficulty is the cost of labour for picking. A machine is now being tested which it is hoped will overcome this trouble. It is designed on the vacuum principle. The area planted last year was 134 acres, the yield being 20,336 lb. of seed cotton.

CHANGES IN THE DEPARTMENT OF AGRICULTURE AND STOCK.

Mr. H. C. Quodling to be Director of Agrictulture. Connected with Mr. Quodling will be the Instructors in Agriculture, Messrs. G. B. Brooks and A. E. Gibson; the Field Assistants, Messrs. E. R. Ashburn and H. Bechtel; also the travelling exhibit, which has been sent round to the various shows by the Department; and the State Farms at Hermitage, Bungeworgorai, Warren, Gindie, and Kairi.

Mr. A. H. Cory, M.R.C.V.S., has been appointed Chief Inspector of Stock, and will attend to stock and slaughtering matters in that portion of the State south of Mackay and of the 22nd parallel. He will also exercise veterinary supervision over the Stock Experiment Station at Yeerongpilly.

Mr. G. Tucker, M.R.C.V.S., will be Northern Deputy Chief Inspector of Stock, and will act as Director of the Stock Experiment Station at Townsville, besides attending to stock and slaughtering matters throughout the districts north of the 22nd parallel.

Mr. A. H. Benson, who has been appointed Director of Fruit Culture, took up his duties at the beginning of September. He will attend to all matters affecting the fruit industry, including the administration of the Diseases in Plants Act and the Fruit Cases Act. He will also exercise supervision over the State Nursery at Kamerunga, Cairns.

Mr. Cuthbert Potts, B.A., has been appointed Principal of the Queensland Agricultural College, Gatton, and took up his duties there at the end of September. Mr. Potts comes from the Hawkesbury Agricultural College.

Mr. R. P. M. Short has been appointed Registrar of Brands, while Mr. A. T. Jefferis, B.Sc., has been appointed Science and House Master at the Agricultural College, in succession to Mr. Ellard. Mr. Jefferis was formerly in the Department's Chemical Laboratory. Mr. A. R. Wilkin has been appointed Instructor in Cheesemaking, and his position as a Cream Inspector has been filled by Mr. W. S. Hartley, formerly Dairy Inspector at Nanango.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF AUGUST, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Lennie	Ayrshire	23 July, 1915	1,000	3·8	44·57	
Iron Plate	Jersey	2 Feb. ,,	539	5·5	35·05	
Lady Twylish	,,	5 June ,,	531	5·0	31·33	
Noble Dot	,,	2 May ,,	532	4·8	30·12	
Bluebelle	,,	20 June ,,	628	3·9	28·73	
Netherton Belle	Ayrshire	23 April ,,	549	4·3	27·82	
Miss Bell	Jersey	2 July ,,	529	4·4	27·39	
Lark	Ayrshire	17 June ,,	559	4·0	26·25	
Gretchen	Holstein	15 Aug. ,,	598	3·4	23·75	
Lady May	Ayrshire	7 Mar. ,,	518	3·8	23·07	
Black Bess	Jersey	4 June ,,	451	4·3	22·82	
Lady Athol	Shorthorn	27 May ,,	506	3·7	21·94	
Thornton's Fairetta	Jersey	27 Mar. ,,	351	5·0	20·71	
Lady Lil	,,	27 June ,,	366	4·4	19·37	
Rosine	Ayrshire	7 Aug. ,,	435	3·8	19·37	
Cocoatina	Jersey	6 Mar. ,,	316	5·0	18·64	
Princess Kate	Ayrshire	9 July ,,	463	3·4	18·43	
Lady Melba	Holstein	6 Mar., 1914	399	3·9	18·25	

Grazed on natural pastures, supplemented by a ration of 30 lb. of maize ensilage daily.

GOAT'S MILK FOR TICKS.

Mr. J. F. Keane, Carbeen, writes:—Your article on milch goats in the June issue of the Journal tells me much I did not know, and encourages the idea that we may be on the brink of a very big thing. I have lately met farmers who have raised calves on goats' milk, and all are quite positive that the calves had no ticks on them while receiving the milk. To quote the words of one of them: "I thought everybody knew that, but it is really no good, since they get ticky again as soon as they are turned out." To my mind, the matter is set at rest. It is the goat's milk that kills the tick. Now, if the active principle, whatever it may be, that protects the goat, can slay a comparative monster like a cattle tick in the attenuated form in which it must reach it through the mamma of the goat and the digestion of the calf, what chance would a little thing like a tubercle baccillus stand if it met the full strength of it? If the histologist and bacteriologist ever isolate the goat's "good fairy," something makes me think it will turn out to be an inherent corpuscle rather than a virus.

TO PREVENT MILK FROM CREAMING.

The natural tendency for the minute fat globules is to rise to the surface of the milk, and this will happen to a greater or less degree irrespective as to whether the creams are stirred up by a rotary or semi-rotary movement of the stirring apparatus. The most effectual method of keeping the fat globules intermingled with the milk in anything approximating even proportion is to be attained by stirring the milk by means of a plunger. The adoption of this method is effectual in carrying the fat globules down amongst the lower milk strata.

* NOTES ON THE NEED FOR AND THE VALUE OF ENSILAGE.

The silage method of preserving crops for future need does not take hold with the force that its undoubted merits would justify, and, despite the activity of Officers of the Department of Agriculture in their efforts to popularise the silo as a means for the conserving of fodder in a form highly suitable for sustaining the dairy herd, little addition has yet been made in the quantities of silage prepared from year to year, and the amount of ensilage annually prepared has never reached 5,000 tons —a poor record, indeed, for a State concerned in providing sustenance for 365,000 milch cows.

It is during a season like the past, when the failure of both grass and fodder crops occurred in many districts, that the true value of silage is to be readily recognised. By enabling the surplus crops of a favourable season to be held over in a succulent condition for use during a subsequent "dry spell," the silo provides the safest form of insurance against the depredations of a drought, and renders the farmer practically independent of the influences of adverse weather conditions.

The silo is a necessary adjunct to the dairy farm, and the value of ensilage as a fodder is fully appreciated by dairying communities the world over, except, possibly, in Queensland, where neither the silo nor any substituted method of conserving fodder seems to gain the favour of the dairy farmer.

It is only necessary to instance the disturbing influence exerted by the recent dry spell upon the volume of the production of dairy products, in order to gain an insight into the amount of wealth lost to the dairying community on account of improvidence and non-acceptance of the silo as an approved method of fodder conservation. The dairy farmers operating without a supply of fodder in reserve were forced to purchase food for their stock in the open market at a rate which prohibited the production of milk at a reasonable cost; and, instead of the dairymen being in a position to take advantage of the relatively high prices maintaining for dairy produce throughout Australia at the time, they were actually conducting their dairies at a loss.

Cases of dairy farmers being compelled to temporarily relinquish dairying, and place their dairy herds upon agistment in more favoured localities, were of common occurrence.

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* Contributed by the Director of Agriculture and Mr. G. Graham (Dairy Expert).

An adequate supply of ensilage upon the farms would have eliminated or, at least, materially reduced the distress directly occasioned by the scantiness of the rainfall. Our methods of farm husbandry must remain incomplete until such time as silage is afforded greater attention by stockowners.

Ensilage exerts a decided tendency towards equalising the summer and winter production of dairy produce, for by its use silage assists in keeping the milk yields even and permanent throughout the year.

Ensilage is an attribute to success in dairy enterprise, and a bountiful supply of this fodder contributes largely to the profits derivable from the well-managed dairy farm.

The Stock-raisers resident within the closely settled areas can ill afford to be without the silo and its attendant advantages, particularly as a ration of ensilage is relished alike by oxen, sheep, and swine. These animals thrive when fed upon the succulent silage, which is equally efficacious for the purpose of producing flesh or milk when used in conjunction with a food rich in protein such as lucerne or cowpea.

It must be recognised at this period, when high prices for building material prevail and when people are anxious to husband their resources, that the time would be inopportune to advocate an outlay for silo and plant; consequently, immediate expansion in the way of conserving fodder must be on inexpensive lines, and in this connection the method of putting up green fodder in an approved manner in the form of a silage stack should readily appeal to all dairymen and stock-owners within closely settled areas.

For reasons stated, it is the aim of the Department of Agriculture and Stock to encourage fodder conservation throughout all Dairy districts.

The results accruing from previous work carried out under the direction of Officers of this Department have demonstrated the efficacy and practicability of the methods advocated.

This year it is purposed to send Officers out to give demonstrations in approved methods of silage-stack construction at a number of different dairying communities. These Officers will work in conjunction with the respective Dairy Inspectors, who are now making inquiries and organising with a view to the initiation of a widespread scheme of fodder conservation. The primary effort is to secure two farmers in each district willing to grow crops for the purpose of providing supplies of green maize to be used in connection with the demonstrations previously referred to. Naturally, it is anticipated that a considerable number of farmers in each locality will also plant up areas with fodder crops and actively engage in their preservation in a similar manner.

It is considered that a decided impetus would be given to the movement by various Farmers' Progress Associations encouraging discussion on this subject amongst their respective members. In this way it is possible that publicity may be given to the whole project, and the need of the Silo and the economic part it should play in farm husbandry thereby brought home to those immediately concerned.

TO ESTIMATE THE AMOUNT OF COMMERCIAL BUTTER CONTAINED IN MILK OF VARYING BUTTER-FAT TEST.

In connection with this matter the following noting has been made by Mr. E. Graham, Dairy Expert:—

"Usually the amount of commercial butter to be won from milk of a given test is to be most readily and accurately estimated by reference to a chart. In this State, O'Callaghan's Chart is in general use, and the chart is procurable from most booksellers of note. In the absence of the chart for determining the commercial butter content of a known quantity of milk of a given test, it is possible that the most accurate formula to be adopted for this purpose is as follows:—

> First deduct ·22 from the butter-fat test; then multiply the remainder by the number of pounds of milk; next divide the product by 85. The quotient represents the estimated yield of commercial butter.
>
> *Example.*—Find the commercial butter-fat content of 85 lb. of milk testing 3·8 per cent. of butter-fat—

$$3{\cdot}8 - {\cdot}22 = 3{\cdot}58 = \frac{358}{100}$$

We then have—

$$\frac{358}{100} \times \frac{85}{85}$$

$$= \frac{358}{100}$$

$= 3{\cdot}58$ lb. of commercial butter."

MAINTENANCE OF YOUNG PIGS.

In laying down plans to maintain 100 pigs and carry them on to a fattening stage, either the initial work entailed in the rearing of the animals has been overcome, or else some natural supplementary food from the dairy farm or factory is available.

A supply of milk or by-products plays such an important part in the management and early life of young pigs that the change to their maintenance on "grazing" or "soiling" crops should preferably be a gradual one, and for obvious reasons the chief crops should be rich in flesh-forming constituents.

Lucerne is practically the main stand-by for pig-raising on this account. At certain periods of the year mature crops of cowpeas are invaluable also for the same purpose, and for fattening.

Apart from the consideration or the element of danger in using immature plants of the Sorghum family as food for animals, the crops mentioned by Mr. Evans—viz., Sorghum, Kafir Corn, Panicum, and Millets—if grazed as early as intended, will not supply the character of

food necessary for maintaining growing pigs, nor will these fodders be altogether satisfactory for assimilation in large quantities. From the investigations of the Agricultural Chemist it would appear that there is always danger in using plants of the Sorghum family when immature, and for this reason other crops are to be preferred if such a choice can be made. The seed heads of Kafir Corn and Sorghum make excellent food to supplement other classes of farm crops, and play an important part also in pig maintenance and for fattening.

Without a fuller knowledge of the conditions under which it is purposed to keep these pigs, generalities can only be touched upon—that is to say, the names of the most suitable crops for pig-feeding can be given, and the sowing of these crops to maintain a continuity of feed depends a great deal on the judgment of the person who is in charge of the animals and the conveniences at hand. A supply of green food in the way of Lucerne can only be kept up throughout the greater part of the year by means of irrigation. Other crops which can be grown under field conditions may be set down as follows:—Rape and Barley for sowing in March and April. Field Peas of various kinds in May and June. Maize, Kafir Corn, Sorghums, and Cowpeas in Spring and Summer. Cabbages, Swede and other turnips for planting in late February, March, and April; Mangels in April and August. Sweet Potatoes, Jerusalem Artichokes, Pumpkins, and Melons in Spring.

LICE ON PIGS.

To get rid of this trouble, cleanse the skin thoroughly with soap and water, and then rub in a decoction of Stavesacre—1 part to 40 parts water.

FEEDING MOLASSES TO SHEEP WITHOUT CHAFF.

In reply to a correspondent on this subject, Mr. W. G. Brown, Instructor in Sheep and Wool, advises as follows:—

"Without roughage such as chaff, or old grass, molasses would not be a valuable feed for stock. A sheep drinking molasses would allow the liquid to pass directly into the 3rd or 4th stomach and right through the system. It is doubtful if sheep or any other animals which chew the cud would get much benefit from molasses. It would act as a purgative.

"The usual proportions of molasses to water used in mixing with rough feed of any kind is half water, half molasses, with about 2 oz. of salt to the gallon of mixture; this is mixed up with the chaff. In my opinion a method of feeding to keep sheep alive, which was used at Thurulgoona in 1902, would be quite as good, and very little dearer.

"About 4 oz. of maize per head per day, thrown on the ground in the form of a circle 50 yards in diameter, will keep sheep alive easily, and will cost one-third of one penny per day with corn at 6s. per bushel. I know this saved the lives of 30,000 sheep fifteen years ago.

"Molasses is good with roughage. In pure liquid form, not nearly so good."

THE LATE P. R. GORDON.

Amongst the many old colonists who have lately passed away, and whose loss must be considered as almost a national one, is P. R. Gordon, who for many years held the position of Chief Inspector of Stock in the Department of Agriculture and Stock. In his youth he received his first training in the office of a solicitor or writer to the signet, in Aberdeen, and afterwards took great interest in matters dealing with stock of all kinds, which training was to stand him in good stead when, later on, he left the old country and settled in Victoria, where he became a station owner and manager. Subsequently he went to New South Wales, and was appointed metropolitan inspector of stock under the late Alexander Bruce. He assisted Mr. Bruce in stamping out the scab disease in sheep in New South Wales. In 1867 Mr. Gordon came to Brisbane, where he received the appointment of Chief Inspector of Stock. In that year he assisted to draft the Diseases in Sheep Act of 1867. and subsequent amendments. He was also the originator of the Brands Act of 1872, and, having had experience of the working of the Brands Act in New South Wales, he framed the Queensland '72 Act, which is, without doubt, the best system in Australasia, if not in the world. In Mr. Gordon's early days, there were no Parliamentary Draftsmen, and therefore, the framing of the Stock Acts, &c., devolved greatly on him, and his earlier experience in a lawyer's office greatly aided him in this, and similar work. He was, in conjunction with the late John Fenwick and Gresley Lukin, the originator of the present thriving institution, the Queensland National Agricultural and Industrial Association. Versatile in his accomplishments, he was one of the founders and chief supporters of the Brisbane Musical Union. He played several instruments, amongst them the drum tympani, and if the drums went astray, he took a score and sang in the chorus. In all expositions, such as the Indian and Colonial and others to which Queensland exhibits were sent, he was a leading factor in advancing the State's interests. He and Mr. Bruce were originators of the Annual Conference of Chief Inspectors of Stock of Australasia, conferences which were held alternately in the different States, with a view to establishing uniformity in all matters connected with the movements, diseases, &c., of stock. Mr. Gordon was always an advocate of a Stock Institute on the lines of the Pasteur Institute, to which all matters connected with stock should be submitted. In this, however, he was not supported by the other States, but he succeeded in founding the original Stock Institution, which was located in a temporary building in Turbot street, Brisbane, of which Mr. J. C. Pound (now Director of the Yeerongpilly Institute) was appointed director.

Those who were intimate with him will remember him as a good raconteur, reciter, and comic singer, his favourite comic song being "The Lively Flea." Mr. Gordon was always a strong advocate for introducing new blood into the flocks and herds, horses, and swine in the State. He compiled, and issued at one time, "The Drovers' Guide," which embodied the best parts of the various Acts he assisted in framing.

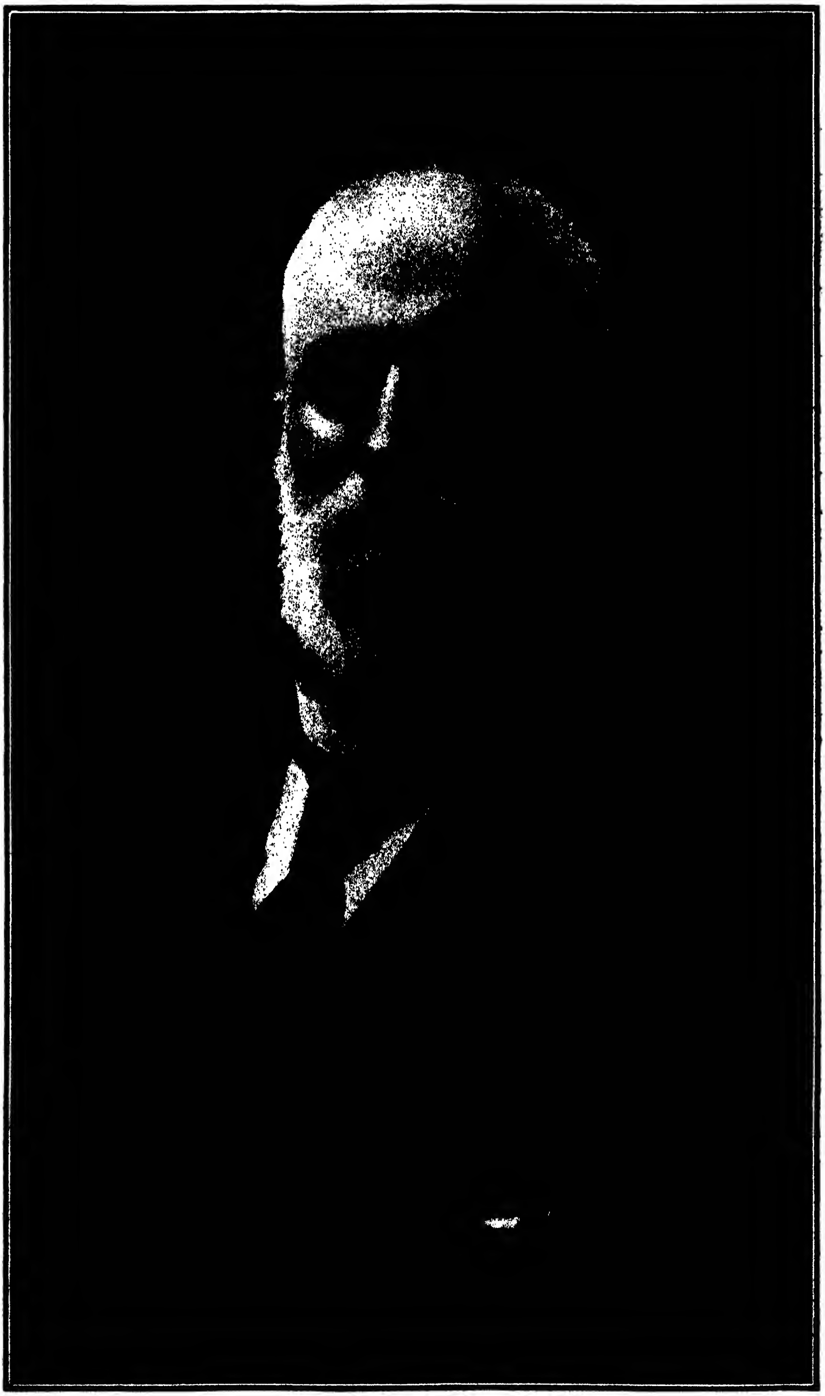

PLATE 16.—THE LATE P. R. GORDON, CHIEF INSPECTOR OF STOCK FOR QUEENSLAND FROM 1868 TO 1904.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JULY, 1915.

Six thousand five hundred and sixty-three eggs were laid during the month, an average of 123·8 per pen. Most of the birds have now settled down to work and are doing well. E. A. Smith's Black Orpingtons win the wonthly prize with the splendid total of 150 eggs. The following are the individual records:—

Competitors.	Breed.	July.	Total.
Jas. McKay	White Leghorns ...	144	507
Mrs. J. Jobling, N.S.W.	Black Orpingtons ...	135	505
Mrs. Munro	White Leghorns ...	131	454
J. Gosley	Do.	146	454
J. D. Nicholson, N.S.W.	Do. ...	117	435
A. W. Bailey	Do.	133	429
C. E. Bertelsmeier, S.A.	Do.	118	428
S. E. Sharpe	Do.	131	426
J. R. Wilson	Do.	130	423
J. M. Manson	Black Orpingtons ...	144	416
King and Watson, N.S.W.	White Leghorns ...	129	416
Kelvin Poultry Farm	Do.	136	416
E. F. Dennis	Do.	126	403
A. H. Padman, S.A.	Do.	107	402
C. F. Clark	Do.	124	400
A. T. Coomber	Do.	113	386
T. Fanning	Do.	116	384
E. Le Breton	Do.	141	383
E. V. Bennett, S.A.	Do.	117	381
H. Harmill, N.S.W.	Do.	126	379
R. Jobling, N.S.W.	Do.	128	376
R. Jobling, N.S.W.	S. L. Wyandottes ...	111	371
J. M. Manson	White Leghorns ...	120	368
O.K Poultry Yards	Do.	116	368
T. Fanning	Black Orpingtons ...	140	367
C. Knoblauch	White Leghorns ...	108	366
F. Clayton, N.S.W.	Do.	122	361
Geo. Tomlinson	Do.	128	358
R. Burns	Black Orpingtons ...	126	357
W. Meneely	Do.	128	357
Cowan Bros., N.S.W.	White Leghorns ...	117	354
W. Purvis, S.A.	Do.	136	347
E. A. Smith	Do.	132	346
Derrylin Poultry Farm	Do.	132	343
W. Parker	Do.	132	343
Moritz Bros., S.A.	Do.	123	340
R. Burns	S. L. Wyandottes ...	132	336
Cowan Bros., N.S.W.	Black Orpingtons ...	139	333
W. Lyell	White Leghorns ...	111	330
J. Aitchison	Do.	96	327
W. Lindus, N.S.W.	Do.	140	314
G. H. Turner	Do.	122	308
J. Zahl	Do. (No. 2)	110	308
J. Zahl	Do. (No. 1)	136	302

Competitors.	Breed.	July.	Total.
J. G. Richter	White Leghorns ...	128	288
E. A. Smith	Black Orpingtons ...	150	282
Loloma Poultry Farm, N S.W. ...	Rhode Island Reds ...	107	260
J. G. Gill	White Leghorns ...	116	260
E. Pocock	Do.	100	247
S. Chapman	Brown Leghorns ...	101	211
F Clayton, N.S.W.	Rhode Island Reds ...	124	187
W. H. Forsyth, N.S.W.	White Leghorns ...	103	168
J. R. Johnson	Plymouth Rocks... ...	85	85
Totals	...	6,563	18,695

[The above report was inadvertently omitted from the September issue of the Journal—Ed.]

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, AUGUST, 1915.

Seven thousand one hundred and seventy-six eggs were laid during the month, an average of over 135 per pen. T. Fanning's Black Orpingtons win the monthly prize with 154 eggs. The following are the individual records:—

Competitors.	Breed.	August.	Total.
Jas. McKay	White Leghorns ...	139	646
Mrs. J. Jobling, N.S.W.	Black Orpingtons ...	135	640
Mrs. Munro	White Leghorns ...	140	594
J. Gosley	Do.	140	594
C. E. Bertelsmeier, S.A....	Do.	147	575
J. D. Nicholson, N.S.W.	Do.	138	573
S. E. Sharpe	Do.	141	567
A. H. Bailey	Do.	138	567
J. M. Manson	Black Orpingtons ..	149	565
J. R. Wilson	White Leghorns ...	142	565
Kelvin Poultry Farm	Do.	143	559
King and Watson, N.S.W.	Do.	134	550
E. F. Dennis	Do.	140	543
A. H. Padman, S.A.	Do.	140	542
C. T. Clark	Do.	130	530
E. Le Breton	Do.	142	525
H. Hammill, N.S.W.	Do.	146	525
T. Fanning	Black Orpingtons ...	154	521
A. T. Coomber	White Leghorns ...	133	519
E. V. Bennett, S.A.	Do.	129	510
J. M. Manson	Do.	142	510
T. Fanning	Do.	126	510
R. Burns	Black Orpingtons ...	148	505
O.K. Poultry Yards	White Leghorns ...	135	503
W. Meneely	Black Orpingtons ...	145	502
C. Knoblauch	White Leghorns ...	133	499
E. A. Smith	Do.	151	497
R. Jobling, N.S.W.	Do.	120	496

Competitors.	Breed.	August.	Total.
R. Jobling, N.S.W.	S. L. Wyandottes ...	124	495
Geo. Tomlinson	White Leghorns ...	134	492
F. Clayton, N.S.W.	Do.	127	488
W. Purvis, S.A.	Do.	138	485
Cowan Bros., N.S.W.	Do.	131	485
W. Parker...	Do.	139	482
R. Burns	S. L. Wyandottes ...	143	479
Cowan Bros., N.S.W.	Black Orpingtons ...	144	477
Derrylin Poultry Farm	White Leghorns ...	131	474
Moritz Bros., S.A.	Do.	132	472
W. Lyell	Do.	133	463
W. Lindus, N.S.W.	Do.	143	457
J. Aitchison	Do.	115	442
E. A. Smith	Black Orpingtons ...	151	433
G. H. Turner	White Leghorns ...	124	432
J. Zahl	Do. (No. 2)	123	431
J. Zahl	Do. (No. 1)	125	427
J. G. Richter	Do.	131	419
Loloma Poultry Farm, N.S.W. ...	Rhode Island Reds ...	134	394
J. H. Gill, Victoria	White Leghorns ...	134	394
E. Pocock	Do.	133	380
S. Chapman	Brown Leghorns ...	117	328
F. Clayton, N.S.W.	Rhode Island Reds ...	134	321
W. H. Forsyth, N.S.W.	White Leghorns ...	125	293
J. R. Johnston	Plymouth Rocks ...	111	196
Totals	...	7,176	25,871

INCUBATORS.

Mr. Hindes, the Poultry Instructor at the Gatton Agricultural College, advises as follows:—

1. He uses three makes, viz.:—Stewart's Nonpareil (water), Cyphers, and Prairie State (hot-air) machines. All of these do excellent work when properly handled, and may be recommended. There are other machines which are probably equally good, but the above are those with which we have had personal experience.

2. The only advantage of the hot-water machines is that, in the event of the lamp going out, the temperature does not fall to such an extent or so quickly as in the case of the hot-air machines. Water, of course, cools far less quickly than air, the result being that the temperature of the egg chamber will be longer maintained.

3. The idea that a small incubator does not give such good results as a large one is altogether wrong. Our Poultry Expert states that the only "100-chicken" hatch he ever had was from a 60-egg Cyphers machine.

BLACK ORPINGTONS.

According to the Rev. E. W. Sturges—probably the greatest authority in England on poultry-breeding, &c.—the Black Orpingtons are the most popular fowls in the world, owing to their strong basis of utility. They serve the dual purpose of providing large birds for the table, with flesh of first-rate quality; and they are good layers of large brown eggs. They are a docile breed, easily kept within bounds; and the hens make gentle mothers. The chickens are hardy, and easily reared. Mr. Sturges remarks that it is worthy of note that in the Australian laying competitions, which extend over a period of twelve months, the Black Orpington has more than once headed the list with an average of 250 eggs to its credit. In the April (1915) Competition at the Queensland Agricultural College, Mrs. Jobling's Black Orpingtons won the monthly prize with 123 eggs. In August, 1914, T. Fanning's Black Orpingtons laid 165 eggs, which won the top score; and up to June, 1915, in the 12th egg-laying competition at the College, which began on the 1st of April, Mrs. Jobling's birds topped the list with 370 eggs for the three months, Mr. J. McKay's White Leghorns coming next with 363 eggs.

UTILISATION OF PIE MELONS.

A lady correspondent at Goodna writes, on the subject of the value of pie melons, as follows:—

"I have found, in endeavouring to sell pie melons, that people have the idea that they can only make jam of them, and consequently do not buy, because they are too busy to use them in this way. The result was that I had a large number left on my hands; but I have not regretted it, for, although a 'new chum,' I thereby discovered various ways of cooking them.

"(1) *Jam*:—Cut up into dice, and sprinkle with half the sugar over night, adding lemons or rosellas, and boil next day an hour and a-half; then add remainder of sugar and boil twenty minutes. The sugar should be 1 lb. to 1 lb. of fruit. Ginger may be used for flavouring if desired; oranges as well as lemons may be used.

"(2) *Pies*:—Cut up the melon, and boil in water until soft; drain off the water, add sugar and lemon-juice or rosellas. Put a pastry crust over the fruit, and bake.

"(3) *Vegetable*:—Boil in water until soft, with salt, as for marrow.

"(4) *Pickle*:—Cut up some onions and, after they have boiled in salt and water a while, add the melon cut up. With some cold vinegar make a paste of mustard, flour, and sugar (equal quantities of each); add this to boiling vinegar and stir until it thickens; pour this over the melon and onions, well drained from the water in which they have boiled."

Our correspondent adds—

"We tried the method for drying rosellas given in the Journal, and found it answered splendidly. I have just made some melon and rosella jam from fruit kept all the winter."

State Farms.

STATE FARM, BUNGEWORGORAI.

MANAGER'S REPORT FOR THE MONTH ENDING 10TH SEPTEMBER, 1915.

METEOROLOGICAL.—The droughty conditions were somewhat alleviated during the latter part of August by a fall of rain which resulted in 120 points being recorded. This was supplemented by a further fall of 30 points on the 6th instant; and on Friday, the 10th, rain again was experienced, 7 points being registered. The resulting benefits have been practically nullified by the exceptionally strong drying westerly winds since experienced: that is, so far as growing crops are concerned. More especially does this apply to those late sown.

WINTER CEREALS.—The best of these will give very light yields, which is not to be wondered at, seeing that no moisture has been present in the subsoil since the removal of the last crop, and that sufficient to meet the requiremeints of this has not fallen during the usual growing period.

On light sandy soils where the percolation is rapid, probably some of the summer rains were not lost wholly by evaporation, as the crops growing on such situations are slightly better.

In the beginning of last month the indications were that a whole season's work would be lost. Fortunately, at present, the outlook is more hopeful and, given fair conditions, a little more seed than that sown will be garnered. This applies to the sections embodying the new crossbreds.

SUMMER CROPS.—The following have been sown to date, viz.:—10½ acres Teterita, 1½ acres Red Kafir, 7 acres Teff grass.

VINEYARD.—The warm weather has wrought a change here, and, with only one or two exceptions, the varieties have started into growth. Where possible to make observations, the indications are that a heavy crop will result under fair conditions.

CITRUS ORCHARD.—Those trees not seriously injured by the dry weather are covered with blossom, which requires more rain to make it set.

DECIDUOUS ORCHARDS.—The trees in this section, on the whole, are rather late this season, due, no doubt, to the late advent of moisture. Trellised peaches, in most instances, give promise of fair yields.

GRASSES.—The dry weather in the sections put down under "Rhodes" grass killed out a great portion of the plants; but those remaining have demonstrated their marvellous recuperative powers, having shoots at the present time over 1 ft. long (runners). It should be mentioned that this is on light sandy country.

STOCK.—Sufficient vegetation has not appeared in the paddocks to exercise any benefit on the animals depastured therein, but with another fall of rain within a reasonable period, good feed would be assured.

M. E. SOUTTER, Manager.

The Orchard.

CITRUS CANKER.

The Florida Agricultural Experiment Station has published in Bulletin 124 (issued October, 1914), three papers on the new citrus disease, which are summarised as below by the "Agricultural News" of Barbados:—

I.—HISTORY OF CITRUS CANKER: E. W. BERGER.

The realisation that a new citrus disease was present in Florida took place in July, 1913, when it was found in several blocks of grape fruit at a certain nursery. Specimens had been received from another locality a year earlier, but were supposed at that time to show merely an unusual form of citrus scab. The infections were traced partly to importations of *Citrus trifoliata* from Texas, partly to stock obtained direct from Japan. It transpired later that the disease was present in Alabama, Mississippi, and Louisiana.

An order was issued prohibiting importations of citrus plants into Florida; a fund was raised to which the Florida Growers and Shippers' Association contributed 2,000 dollars, and the Governor of Florida 1,000 dollars; and a campaign was started against the disease.

II.—STUDIES OF CITRUS CANKER: H. E. STEVENS.

Grape fruit is most severely attacked, the infection occurring on leaves, twigs, branches, and fruits; then in order of susceptibility follow *Citrus trifoliata*, and the navel and some of the sweet orange varieties, which are affected on leaves, twigs, and fruits. Scattered infections have been found on the leaves and twigs of Satsuma, tangerine, lime, and rough lemon.

The distinguishing feature of citrus canker, as observed in the field, is the characteristic spotting produced on the fruit and foliage. As usually seen, the infection appears as small light-brown spots, from less than $\frac{1}{16}$ to $\frac{1}{4}$ inch in diameter. The spots are usually round, and may occur singly, or several may run together, forming an irregular area. This last usually occurs on fruits. The spots project above the surrounding healthy tissue, and are composed of a spongy mass of dead cells covered by a thin white or greyish membrane. The membrane finally ruptures and turns outward, forming a lacerated or ragged margin around the spot.

On the leaves, infections first appear as small, watery dots, with raised convex surface. These dots are usually of a darker green than the surrounding tissue. Sometimes, however, the surface of the spots is broken as soon as they appear. Spots may appear on either surface of the leaf, but they do not at first penetrate through the leaf tissue. They gradually increase in size, change to a light brown, and become

visible on both sides of the leaf. In the older spots one or both surfaces may be bulged or raised, and such spots are commonly surrounded by a narrow yellowish band or zone. In the more advanced stages the surface of the spots becomes white or greyish, and finally ruptures, exposing a light brown spongy central mass. Old spots soon become overgrown by saprophytic fungi, and may appear pink or black on account of these fungus growths.

On the fruits, the spots are very similar to those formed on the leaves. They project and retain a circular outline. They do not penetrate far into the rind. They may be scattered over the surface, or several may occur together forming an irregular mass. Gumming is sometimes associated with the spots formed on the fruits. Canker, apparently, does not cause a rot of the fruits directly, but opens the way for other fungi to enter and cause infected fruits to rot. The spots on young twigs are like those on the leaves and fruit. On the older twigs they are more prominent, and more or less irregular in shape. This is especially true of old spots. They show the same spongy tissue as is found in the spots on the leaves, but assume a cankerous appearance, and the surface membrane completely disappears. These spots or cankers are formed in the outer layers of the bark tissue, and do not penetrate to or kill the wood. The spots once formed in the bark are persistent, and are not readily sloughed off. They may remain for a long time, and form centres from which infections may readily spread. This is confirmed by observations on infections produced on potted trees in the greenhouse, and in the grove by artificial infection. Some of these spots have been under observation for over a year, and show no tendency to slough off.

Other citrus diseases with which canker may be confused are Scab, Scaly Bark, and possibly Anthracnose. It can, however, readily be distinguished from any of these by noting the following points:—

"1. It differs from scab in the typical round spots produced; the size of the spots, and the fact that the spots penetrate through the leaf tissue. It does not distort the leaves. There are no wart-like projections. Canker occurs on older wood, Scab does not.

"2. Canker differs from Scaly Bark in the size of the spots, which are much smaller and more circular than those of Scaly Bark; and the spongy nature of the spots—Scaly Bark spots are hard and glazed. Canker is common on grape fruit, Scaly Bark is not. Canker forms spots on leaves, Scaly Bark does not.

"3. Canker differs materially from Anthracnose in the size of the spots, which are much smaller than those of Anthracnose. Canker spots are raised, Anthracnose spots are sunken. Canker has spots of spongy character, those of Anthracnose are hard. Canker occurs on young shoots and older twigs, Anthracnose does not."

Experiments in which dry infected material was pinned to young healthy foliage showed that the disease was infectious. Small watery spots appeared in one month, and these had developed in two months into the spots typical of the disease. A fungus was isolated from the young spots, and afterwards identified among those present on the older spots. Infection experiments from pure culture gave positive results in two out of many instances.

The fruiting bodies of the fungus are small globular pycnidia, which exude the colourless spores in thread-like tendrils. The pycnidia are somewhat difficult to distinguish from the tissues of the spots.

The disease spreads with great rapidity in rainy weather, infection proceeds from the old spots even after these have passed through a winter.

III.—ERADICATION OF CITRUS CANKER: FRANK STIRLING.

Mr. Stirling was employed by the Growers' League to try to clear up the disease first of all in Dade County, a district in which the grape fruit industry is developing very rapidly. He tells his story very dramatically.

At the outset some 200,000 nursery trees and over 500 acres of grove trees were cut back, defoliated, and the trunks painted with Bordeaux mixture or carbolineum. "At this juncture everyone began to breathe a little easier." As the inspection proceeded, more and more infection was found, and more and more was treated. The number of infected properties rose to nearly a hundred. Then with the new growth on the trees came the shock of finding that the work had been carried out in vain; that instead of checking the disease, the activity of the workers had actually contributed to its spread.

The next method adopted is even more heroic. A flaming spray produced by a machine "which resembles a plumber's blow-torch, only a hundred times larger," is used to scorch the trees, the grass, and the soil beneath, until the tree is completely charred. In one district 1,933

grove trees and 101,300 nursery trees have been burned. Some fifty men are employed on the work.

When leaving one grove for another, each man changes his suit, the discarded one being disinfected with corrosive sublimate solution. No one is permitted to touch a tree.

According to Stirling, "canker is without doubt the most infectious of any known disease." A certain 4-acre grove of grape fruit trees, inspected in the first week of June, was to all appearances free of canker. Three weeks later one tree began to show a slight infection upon one limb. Four days later canker was found on five trees; in another week the number infected was twenty-seven, and there would have been no difficulty in picking fifty boxes of diseased fruit. Canker is so deadly that a tree is rendered worthless in two or three months from the time of infection.

It will be seen that the citrus canker situation in Florida is affording us the spectacle of an attempt absolutely to eradicate a disease which has already become well established, and that in a district which must always be exposed to reinfection over the land frontier of the State. The odds against success are great, but the cost of failure would be very heavy. "It would be merely a matter of months before the canker would be entirely over the orange belt." The moral for the citrus-growing islands of the West Indies is obvious.

A BANANA BEARING TWO BUNCHES.

Such a *lusus naturæ* may have been observed in Queensland banana plantations, but if so we have never heard of it. The *Bulletin* of the Department of Agriculture of Jamaica (Vol. II., No. 8, August, 1915) publishes an interesting photograph (here reproduced), supplied by the General Manager of the United Fruit Company of Jamaica, Captain S. D. List, recording this very rare occurrence.

"It would be interesting," says the editor of the *Bulletin,* "to see whether the suckers from this plant are capable of reproducing this habit as a double-fruiting type of banana might prove of economic value in increasing the output of bunches from a cultivated area. The expectation is, however, that this is an accidental production and not a confirmed character of the Banana plant."

PLATE 17.—BANANA PLANT BEARING TWO BUNCHES OF FRUIT.

Tropical Industries.

PROFITABLE MANURING OF SUGAR-CANE.

From an article in the "Fiji Planters' Journal" (August, 1915), we take the following:—

A great deal of valuable work has been done in Fiji as well as in other parts of the world during recent years with the object of improving varieties of cane plant-breeding and selection; and new varieties have been evolved or discovered which promise to yield a higher percentage of sugar than various common kinds which have been hitherto widely grown.

It is really an unbusiness-like and old-fashioned policy to grow varieties of cane which yield a large tonnage per acre, but with an actual low sugar content. In the cultivation of sugar-cane, quality stands for quite as much if not more than in other business undertakings.

It is sugar that is wanted, and it is sugar really that is only paid for, for example:—

> 30 tons of a cane containing about 14 per cent. sugar yield 3½ tons of sugar; 25 tons of cane containing about 10 per cent. sugar yield 3 tons of sugar.

And that is not all, for the 5 extra tons entail extra cost for cutting, additional haulage, and milling charges, besides depriving the soil of elements of fertility to no good purpose, necessitating an additional use of fertilisers to make up the deficiency.

Occasionally a heavy crop of a quick-growing variety of cane may yield more sugar on the whole than might be possible to get in the same time from a variety having usually a higher p.o.c.s., but "still" the expenses incurred in harvesting and milking it will be proportionally greater, and should not be overlooked in balancing up the account.

Howbeit, although a planter may make profit from growing a cane with a comparatively low percentage of sugar, he should never cease to aim at producing as heavy if not a heavier crop of cane with the "highest possible p.o.c.s."; and to achieve this desirable end the use of liberal supplies of manures or fertilisers will do much, particularly when suitable combinations are judiciously applied.

The water supply is an obvious controlling factor in the production of good cane fields.

No water supply can surpass the natural rain when it falls in reasonable quantities and at favourable times throughout the growing period of the cane crop. In tropical latitudes, unfortunately, the rainfall is not always exactly as is desired. Sometimes torrential downpours scour the land and beat down the cane. Sometimes the rain is too continuous,

and otherwise excellent cane soil is rendered swampy and sour, which is not beneficial to a good cane development.

In the Hawaiian Islands where the cultivation of sugar-cane has been subject to the most thorough scientific and practical investigations, and where, as the outcome of which, the average production of sugar per acre is higher than in any other cane-growing country in the world, manures costing the cane planters more than 2,000,000 dollars per annum are used, and nitrogen (mostly in the form of nitrate of soda) is the principal ingredient which constitutes by far the greatest portion in this enormous sum of money expended in a group of islands, the total area of which is 1,000 square miles smaller than the Fiji Group.

Nitrates, though of first importance in producing greater yields of sugar-cane, do not supply the probable need also of potash and phosphates. Potash has a marked influence on the carbohydrate (sugar and starch) contents of plants; and consequently, when a soil is deficient in this ingredient, it is expedient to use some sulphate of potash—say 1 cwt. to 1½ cwt. per acre—which should be incorporated in a mixture to apply at time of planting or before ratooning.

Phosphates of themselves do not seem to increase the cane yields to anything like the extent that nitrate and potash do; still, to omit using some phosphatic manure in any manurial treatment would be most inadvisable, as these manures are comparatively inexpensive, and constitute an important factor in maintaining a soil in a necessary state of general fertility.

It is confidently believed that sugar planters in Fiji will find that it is most profitable to always employ a combination of manures containing a suitable proportion of phosphates, potash, and nitrates at the time of planting or when the ratoon crops are starting their new growth. These manure mixtures should be worked or ploughed into the soil along the rows just prior to the time when the cane begins to make its main growth.

The top-dressings of nitrate of soda should be given 1 cwt. per acre (or not more than 1½ cwt.) at a time at intervals of a few weeks during the chief growing period. Two or three such top-dressings will probably be found sufficient and highly satisfactory.

THE MOUNT MORGAN MUNITIONS COTTON LEAGUE.

COTTON-GROWING IN AUSTRALIA: NO COTTON, NO SHELLS.

By G. STEPHEN HART, Mount Morgan.

Many attempts have been made to grow cotton in Queensland, but the trouble of picking it has repeatedly thrown it into disfavour. That it will grow successfully is well known, but it is less generally known that in 1871 Queensland exported 602,100 lb. of cotton—over 1,300 tons

weight, valued at £79,317. That was just after the American civil war. When American cotton-growing recovered, America grew much cotton, and was anxious to sell quickly, even at a low price, and this price was too small to make cotton-growing in Australia as profitable as other crops. The return was all the smaller on account of the cotton-seed being thrown away instead of forming a by-product. From time to time the Government of the day made different efforts to re-start the industry without much success. To-day, the Government guarantees to advance 1¾d. per lb. on raw cotton, to gin it, export it, and sell it, and give any further profit obtained to the producer. On their estimated yield this should give growers more than wages. The Government do not guarantee what would be a safe minimum yield per acre, and farmers not knowing this will not venture to grow it.*

The individual farmer is not yet convinced that he could grow cotton at a profit, but now there is a national reason why he should try. Now, it is no exaggeration to say that the existence of the Empire is largely dependent on the available supply of cotton, for "no cotton, no shells" has become an accepted axiom. If ever Australia could be invaded or cut off from other lands by ocean raids we might realise to our cost, "No cotton in Australia, no shells in Australia." We have been told that a British submarine has already sunk a German super-dreadnought in the Gulf of Riga. Will it take long before submarines improve sufficiently for German submarines to sink British super-dreadnoughts? We hope it will. We hope they will never do it. But what have we to go on?

Australian cycle races were fought out on the old high "bone-shakers" until 1888, when the safety bicycle was used. In the same year Dunlop invented pneumatic tyres, but the bicycle boom did not come until 1896. This boom produced the motor cycle, and, with the powerful engines of light weight used for motor cycles, came the motor-car. Until 1896 no one could drive a motor vehicle along an English road unless preceded by a pedestrian with a red flag, and it was not until 1903 (twelve years ago) that it was thought necessary to legislate specially for motor-cars. The first motor-driven aeroplane was built in 1903, and in 1906 Santon Dumont achieved world-wide fame by flying 200 yards, for, although the Wrights had flown 24 miles the year before, their performance was not generally believed. Now, nine years later, it has been officially announced that Great Britain has 2,500 aeroplanes and Germany 2,000. Probably France has more than either. Each year they become better, and have still lighter and more powerful petrol motors. The submarine also depends upon light and powerful motors. They have

* Minimum yield in a fair season is 1,000 lb. of seed cotton per acre. In 1907 the yield ranged from 1,368 lb. to 4,250 lb. per acre.—ED. "Q. A. J."

only been tested under war conditions for twelve months, and it is quite certain they will be much improved. Whether they will be more quickly improved by Germans than by British, French, and Americans is less certain. Still, it seems more than possible that they may seriously affect the safety of our ocean communication, and we may become, temporarily at least, more thrown on our own resources to protect ourselves from outside raids. We should remember that our AE 2 travelled 30,000 miles before her end came. What will they do next year? Nine years ago Santos Dumont flew 200 yards! And no Australian cotton means no Australian shells.

In 1909 the United Kingdom imported close upon 1,000,000 tons of raw cotton, of which 732,359 tons, valued at £41,174,869, came from the United States, and 38,399, valued at £1,724,923, from British possessions. For 10,000,000 soldiers 1 lb. of cotton per man would mean about 4,500 tons. I do not know how many pounds of high explosives made from cotton each soldier, on the average, uses in one year, but as a guide it may be taken that 1 lb. of cordite is required for about 250 rifle cartridges, and 500 lb. of cotton makes one charge for one 15-in. shell for the "Queen Elizabeth." That illustrious chemical savant, Sir William Ramsay, has, with others, been asserting, again and again, that no cotton means no shells, and has at last prevailed upon the allies to declare cotton contraband of war, and that unless we have cotton in Australia we are defenceless. Shall we grow it or import it? Or shall we sit down without it till we see if anybody comes our way?

The ultimate fate of Australia is now being decided in Europe, and patriotic Australians who are fit and free to do so are hurrying there to help; but cannot those who stay behind do something? A number of fitters are to be used in Queensland to make shells. A single lathe capable of making 20 shells a day is gladly accepted. So would a contribution of 1,000 tons—or even 100 tons—of cotton. From world statistics it may be taken that 5 acres of cotton-plants yield 1 ton of ginned cotton. The yield from perennial cotton, where unaffected by frost, is as high as 5 lb. of bolls or 2½ lb. of lint per plant. As the picking necessitates considerable labour it would seem better for many to grow small areas of up to (say) 5 acres each, rather than for individuals to attempt large plantations.

We have all over Australia, women working industriously at Red Cross work for our soldiers. Individually, each one's work may seem but a drop in the ocean, but they are showing that sufficient drops make an ocean. Why should not each of the 20,000 residents of Rockhampton and each of the 12,000 residents of Mount Morgan grow one cotton-plant? Why should not each of the 600,000 residents of Queensland grow one plant? Their little contributions could be taken to the local municipal

authorities to forward to Brisbane. The Government's advance of 1¾d. per lb. could be a good addition to our patriotic funds. But the farming community could help more largely. Many feel they cannot leave their land to become a wilderness whilst they fight a year, or two years, or three years in Europe, and many know they cannot leave their families unaided in the bush. But if they cannot give their lives they can give some of their time and energy. They can often give more time than ready cash to help the Empire. Even if there was no cash return from their cotton-growing they could do this, and cotton-growing is not unprofitable. If a man has land, let him grow some cotton, even if only a little. Let him grow what he can harvest himself or with paid labour, and then, if volunteer pickers are available, let him plant another piece to be picked by these volunteers and sent to the patriotic fund suggested above.

In these ways we should at least get sufficient cotton to help the Empire, or to help Australia if she was put to a sudden test of her internal strength, and we should all get more familiar with the cotton-growing industry, which yields its hundreds of millions worth of produce year after year. Then we should know if we could add it to our list of exports or, better still, to our list of internal manufactures.

These suggestions are put forward with the hope that they will be improved upon, and carried to a successful issue, under the guidance of those amongst us who have had many years' successful experience in cotton-growing; but we should move quickly, as seed planted in September and October or even November should produce a harvest about the close of the next European winter.

PRACTICAL SYMPATHY FOR AN ORCHARDIST AT THE FRONT.

A splendid example of appreciation of the patriotism of a vigneron at Renmark, who enlisted in the Commonwealth Military Reserve Forces, was afforded by his fellow orchardists in September last. No less than sixty volunteers answered the call of the Renmark Agricultural Bureau to prune Reservist Starke's vineyard on Saturday afternoon, 12th September. Some had been at work the previous Saturday, and a few that morning, and the crowd in the afternoon very soon had the 5 acres of currants, malagas, and sultanas pruned clean, rods tied up, and cuttings raked off the ground. The erection of a row of trellis was also included in the afternoon's work. Arrangements were made for ploughing the land by volunteer teams and labour on the following Saturday, and Mr. Barge, who is looking after his brother-in-law's property during his absence, reckons to manage all right now till harvest. Private Starke was the first man to leave Renmark at the call to arms, and he is so far the only married man from this settlement with the troops in Europe. His grape crop was harvested by voluntary labour in the summer, and the house which he left half built has been pretty well finished off by unpaid labour and a donation from the Renmark Patriotic Fund.

Entomology.

CONTROL OF THE CANE BEETLE.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

Studies relating to the control of our common Cane Beetle (*Lepidiota albohirta*) during its grub stage are being continued, experimentation having for the most part been confined to the trial of various poison-baits.

This interesting branch of research will be carried on as long as possible, but may have to be abandoned shortly, as the majority of larvæ will soon be pupating, and in some districts have already gone down out of reach of the plough.

Prevailing dry conditions have forced cane grubs to penetrate into the ground more deeply than usual to obtain a sufficiency of moisture, and at present in localities where the soil is of a light nature it appears likely that the beetles may make an exceptionally early emergence this season.

Perfectly developed adult forms of *albohirta* are often found below ground in their pupal chambers patiently awaiting the occurrence of certain conditions of temperature and moisture conducive to a general emergence of the pest.

Odd specimens may be dormant in this way for two or even three weeks. and in abnormally wet seasons when grubs pupate near the surface have been ploughed up as early as the middle of October. It may be of interest to note that an adult specimen of *albohirta* was found in dark volcanic soil at "Green Hills" on the 28th of July, the earliest previous record of the kind at the Laboratory being 14th October, 1913.

Towards the end of July I was instructed to proceed to Mossman to attend a conference of the Australian Sugar Producers' Association, and prepare a paper reviewing the work instituted at Gordonvale Experiment Station during the past ten months.

The reading of this paper was followed by a discussion having reference mainly to the complex question of Natural Control and the possibilities of our being able to artificially enlarge its sphere of usefulness.

Speaking of predacious insects, it was pointed out that action in this direction was not always advisable in the case of indigenous species, owing to the repressive influence exercised by their hyperparasitic and other foes.

I have already stated in a previous report that knowledge of this fact need not necessarily cause us to wholly neglect such methods, or regard them as being invariably beyond our control. It is not unreasonable to assume that in a vast territory like Queensland supporting a

great variety of useful insects inhabiting widely separated districts, we might be able in some cases to derive assistance from the introduction of useful native species of local occurrence, provided they were transferred from considerable distances and without their hyperparasites and other natural enemies.

As an instance in point it may be mentioned that a chalcid parasite of our formidable sheep-maggot flies, discovered by the writer in Central Queensland on 10th October, 1913, is at present extensively bred at the Brewarrina Laboratory, and has already been distributed to sheep stations in many parts of New South Wales, where it is considered to be a very important factor in reducing the numbers of these destructive blow-flies.

Allusion was also made at Mossman to the matter of proposed importation from other countries of such useful insects as the "digger-wasp" (*Tiphia parallela*), a well-known enemy of various Scarabacidæ closely related to our cane beetles. With further reference to this parasite it may be well to mention that before introducing it into Queensland it would be necessary to take steps to ascertain if our soils and other important conditions resemble those obtaining in localities where the insect occurs naturally or has been successfully established. These investigations would have to be conducted by a capable entomologist, who, in the event of finding normal conditions practically alike in essential particulars, would then collect a large quantity of Tiphia cocoons, pack them suitably, and forward same to Australia in cold storage.

Other matters were discussed, one of which referred to the apparent scarcity of grubs in certain districts owing to causes unknown. We hope to find time to investigate cases of this kind which may afford some clue of considerable value.

In many instances, however, such immunity may reasonably be attributed to unsuitability of the soil, or the absence of food plants of the beetle in the vicinity of plantations, or possibly to a natural non-occurrence of the pest due to the presence of adverse climatic or other influences.

CANE BEETLES AND ARTIFICIAL LIGHT.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomogist to the Bureau:—

As a result of certain field experiments conducted during November and December last, acetylene light was proved to be very attractive to both sexes of our principal cane beetles throughout their aerial existence, such reaction, however, being considerably influenced by various meteorological and other conditions.

The movements of the beetles whilst flying near artificial light were studied, particularly their manner of approaching the trap and behaviour when within a foot or so of the flame; and certain conclusions were arrived at regarding the kind of design most likely to produce a serviceable light trap, and the conditions under which the latter might be expected to yield payable results. As an outcome of these observations it is proposed to construct an entirely new form of trap for trial during the coming season. Such contrivances usually aim at

capturing the insects by means of a shallow tray or pan containing water and kerosene placed under a strong lamp. This principle, however, is not to be commended in the present instance for the following reasons:—In the first place, it entails needless labour and expense, which, although small, would nevertheless be appreciable when dealing with a number of traps; secondly, it would destroy a certain proportion of useful insects, both parasitic and predaceous, which help to control not only the cane beetle in question, but a number of other insect pests of sugar-cane.

In this connection I may mention that a well-known enemy of cane grubs (*Dielis formosus*), the common "Digger Wasp," and probably beneficial Cockroach (*Ellipsidion pellucidus,* Brunn.), which frequents the foliage of sugar-cane are susceptible to the influence of artificial light. An arboreal species of earwig also, which I believe to be predaceous on small Lepidopterous larvæ of at least one of our cane pests, is attracted in great numbers.

The grey-backed Cockchafer (*Lepidota albohirta*) responds to the stimulus induced by acetylene light from a considerable distance, the phototropic influence being wellnigh irresistible, and compelling this insect to advance towards the trap. It rarely flies directly into the flame, but when within a few yards approaches in an erratic manner by a series of short flights, settling at brief intervals on the ground or on cane plants, and, finally, as though struggling against the attractive force, plunging headlong downwards at a distance of about 1 ft. or 18 in. from the light. Our new trap will be fitted with a landing stage designed to take advantage of the above habit, and immediately capture all beetles that may settle or fall upon it, and deposit them in a large chamber from which return will be impossible. Suitable exits will, of course, be provided for useful insects such as Carabidæ (predaceous ground beetles) and the various hymenopterous parasites.

The light will be protected in such manner as to throw beetles that may attempt to dash into it on to the stage below to their certain doom, but at the same time prevent the destruction of beneficial species.

By making use of a discovery relating to a peculiar habit connected with the flight of this insect when taking to wing, it will be a simple matter to prevent cane beetles from flying out of the trap.

Recent experiments with regard to the control of *Lepidiota albohirta* whilst in its larval form have for the most part given negative results, but, although apparently inconclusive, such work in reality serves a useful purpose by directing investigations into more and still more promising channels, which, owing to this gradual process of contraction, must eventually come to a focus somewhere, and in all probability reveal a pathway to discoveries of decided economic value.

Whilst stationed at Gordonvale, I have sought to embrace present opportunities for studying the life history and economy of many insect pests of sugar cane, the majority of which, although of minor importance, include a few decidedly injurious species and several hitherto undescribed forms. Such knowledge is essential to a comprehensive survey of the cane-grub problem, it being, of course, quite possible to advocate control methods that, whilst successful against one kind of pest, may destroy certain natural enemies of another, and so tend to favour an abnormal increase of the latter species.

Botany.

ILLUSTRATED NOTES ON THE WEEDS OF QUEENSLAND.

By J. F. BAILEY and C. T. WHITE.

No. 1.

On Three Closely Allied Weeds—Aster subulatus, *Michx.*; Erigeron canadensis, *Linn.*; and Erigeron linifolius, *Willd.*

As there has been confusion for some time past in Queensland between the two weeds *Aster subulatus* and *Erigeron canadensis* (Canada Fleabane), it has been deemed advisable to prepare this series; ray florets 20-30 scarcely exceeding the pappus, more numerous A description and figure of the closely allied *Erigeron linifolius* (Rag Weed) is given for comparison.

ASTER SUBULATUS, Michx.

Annual, glabrous; stems paniculately branched, flexuous above, 1-6 ft. high, slightly angular. Stem leaves linear-lanceolate, acute, entire, sessile by a broad or slightly clasping base, 2-10 in. long, 1-8 lines wide, those of the branches very small and subulate. Flower heads numerous, 3-5 lines broad; involucre campanulate or at length hemispherical, the bracts linear-subulate, green, imbricated in 3 or 4 series; ray florets 20-30 scarcely exceedingly the pappus, more numerous than the disk florets. Achenes compressed, minutely pubescent.

This North American plant has for some time passed in Queensland as a glabrous form of *Erigeron canadensis;* but on going fully into the matter we have determined it as above. It is very abundant in cultivation paddocks and waste places about towns in Queensland. In New South Wales and Victoria it has been recorded as *Aster dumosus,* Linn, but J. H. Maiden and E. Betche, in a note in Proc. Linn. Soc. N.S.W., vol. 24 (1909), p. 363, record it as *Aster subulatus* Michx., after referring specimens to H. L. Fernald, a well-known authority on North American plants.

Although the plant is a very common weed here, we know of no local name applied to it.

CANADA FLEABANE.

ERIGERON CANADENSIS, Linn.

Annual, hispid-pubescent or glabrate; stems usually much branched; 3-10 ft. high. Lower leaves elongate-spathulate, entire or toothed, 1-4 in. long, stem leaves linear and mainly entire. Flower-heads small and very numerous, peduncles slender; involucre campanulate, the bracts narrow, acute, about 2 lines long; ray florets numerous,

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Plate 18.—Aster subulatus, *Michx.*

Plate 19.—Erigeron canadensis, *Linn.*

Plate 20.—Erigeron linifolius, *Willd.*

scarcely exceeding the involucre, more numerous than the disk florets. Achenes very small.

This North American plant—now widely spread in warm and temperate countries—has lately established itself as a weed in several places in Southern Queensland, and has become especially abundant in the Nerang and Coomera districts.

RAG WEED.

ERIGERON LINIFOLIUS, Willd.

A coarse erect annual, several feet high, clothed with long soft hairs or shortly scabrous-pubescent. Radical leaves petiolate oblong, often coarsely toothed, stem leaves sessile, entire or remotely toothed, often above 2 in. long. Flower-heads rather small, pedunculate; involucre broadly ovoid or almost hemispherical, the bracts narrow, acute in 2 or 3 series; female florets very numerous shorter than the pappus, the outer ones usually dilated at the tip into a minute ligula; disk florets few. Achenes small, pubescent.

A common tropical and sub-tropical weed indigenous in Queensland, generally known as "Rag Weed," but in some places as "Cobblers' Pegs"; this sobriquet is now, however, more commonly applied to *Bidens pilosa*.

Eradication—All these species being annuals, to effectively eradicate, the plants must be prevented from seeding.

STOOLING PROCLIVITIES OF WHEAT.

Experiments comparing the yields of individual varieties per single grain sown have not been carried out by the Department, the usual course being to plant up larger areas of land so that field tests may be carried out under ordinary field conditions. The stooling proclivities of different wheats vary to a considerable extent. Winter wheats, when fed off or kept in check, have a tendency to throw out a large number of stems, possibly 50 in number. On the other hand, quick-maturing wheats rarely throw out more than three or four stems, unless fed over. It will thus be seen that comparisons as to the stooling habits of different wheats are not always an indication of their value for grain purposes. Of the three varieties—Golden King, Hermitage, and Cleveland—the two former are mid-season, moderate stooling varieties, whilst the latter usually takes a longer period to mature and stools more heavily. The name Golden King is synonymous with Gluyas Early. The heaviest stooling wheats referred to above—*e.g.*, Winter Wheats—belong to the Manitoba and Fife families. Other wheats with the same characteristics are commonly grown in cold countries.

Vegetable Pathology.

EXPERIMENTS WITH POISONOUS SPRAYS FOR THE DESTRUCTION OF WEEDS AT THE SUGAR EXPERIMENT STATION, MACKAY.

Some time ago it was promised that the Sugar Bureau would undertake experiments with arsenical sprays for the purpose of determining whether weeds could be successfully and economically destroyed. In the composition of the sprays used it was determined to follow the experience of other countries, and accordingly two mixtures were made up.

The first solution was made up as follows:—

8 lb. arsenic and 2 lb. caustic soda were mixed together in the dry state, and water slowly added until dissolved. Sufficient heat was generated to bring the mixture to almost boiling point. This was then made up to 5 gallons, and for use was diluted to 300 gallons.

The second solution was made in the same way as the first, but about 40 oz. of washing soda was added.

The Chemist in Charge of the Experiment Station at Mackay (Mr. L. C. McCready) states:—

The experiments were divided into two series, as follows:—

SERIES No. 1.

Sprays used on growing cane with a view to testing their effects on the destruction of weeds, and also to determine whether their use had an injurious effect on the growing cane.

SERIES No. 2.

Sprays used on open headlands solely with a view to the destruction of weeds and grasses.

No. 1. SERIES.

1. All ground between cane drills on inside and half the space on the outside received a fortnightly spraying at the rate of approximately 75 gallons to the acre. Great care was exercised in this case that the cane itself received none of the spray.

2. This section received the same treatment as the first section, with the exception that the No. 2 Spray formula was used.

3. This section received a spraying with No. 2 Spray formula at the same rate as Nos. 1 and 2; but in this case the cane was also sprayed around the bottoms.

No. 2 SERIES.

In this series two portions of headland were sprayed as under, using the same quantity per acre as in the first series:—

1. Sprayed with No. 1 Spray formula solution.
2. Sprayed with No. 2 Spray formula solution.

The spraying was at first carried out every fortnight; but, as this made little or no impression on the grass, the application was increased to a weekly spraying.

RESULTS.

The results in No. 1 Series cannot be taken as conclusive, for the reason that when the experiment was first started the cane was well advanced in growth, and as a consequence soon reached a stage where it was impossible to walk between the rows with a spray outfit. The cane having closed-in rows, many of the softer grasses perished naturally by the exclusion of sunlight. It is, therefore, a debatable point whether the dying of some of the weeds should be attributed to the above factor or to the effects of the sprays. No positive conclusion can, therefore, be drawn from this series until the experiment is again tried on cane of younger growth.

The following notes have been made, although from the reasons stated above they must not be taken as positive:—

SECTION 1.

Weeds such as pig weed, billy-goat weed, and red asthma were destroyed almost on the first spraying, whilst grasses such as couch and crowsfoot, beyond a slight yellowing during the first few days after spraying, soon recovered and grew as robustly as ever. Summer grass and mystery grass in some cases were killed, and in others survived.

SECTION NO. 2.

The results in this section were identical with those found in the first section.

SECTION NO. 3.

The effects of the spraying on this section with reference to weeds and grasses were identical with the former two sections. With regard to its effect on the cane, no real damage has been done, the cane having at the present time survived and thrown off any apparent injury.

A day or two after spraying, the leaves and bottom of the stool present a very withered and burnt looking appearance. In one or two individual cases where the spray reached into the heart of the cane sucker or shoot, the leader has been burnt out and the cane killed. According to the writer's mind, the wilting and burning of the leaves cannot fail to have anything but a prejudicial effect on the growth and vitality of the crop—first by limiting transpiration on account of the wilting of its foliage; and, secondly, by the set-back to growth, and the subsequent struggle rendered necessary to throw off the ill effects and re-establish growth.

SERIES 2.

In this case both sprays have given equal results, and have been successful in destroying all weeds, with the exception of couch grass and crowsfoot grass. The couch at first appears wilted, but soon overcomes the effects, and three or four days after spraying has again established itself. With reference to star grass, the effects of the poison to date has failed to kill it. The individual plants are, however, very small and stunted in appearance, and there is no doubt that eventually the grass would succumb to the poisons.

The cost of material and labour amounted to £1 17s. 7d. per acre for work amongst cane rows, and £1 0s. 7d. per acre for headlands, for one spraying only.

Commenting on the above, the General Superintendent considers the growth of weeds to be too great at certain seasons of the year on our Northern canefields to be economically dealt with by means of arsenical spraying. In the red soils of Childers and Isis, where weeds do not grow to any extent, the work might be done at a considerably lower cost, and this land is similar to the Hawaiian lands where spraying was cheaply carried out.

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JULY IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JULY, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	July.	No. of Years' Records.	July, 1915.	July, 1914.
North Coast.	In.		In.	In.
Atherton	0·89	13	0·40	0·39
Cairns	1·14	27	3·18	0·35
Cardwell	1·39	27	0·88	0·25
Cooktown	0·83	27	1·91	1·47
Herberton	0·57	27	0·22	0·37
Ingham	1·50	22	0·71	0·90
Innisfail	4·13	27	5·79	1·27
Mossman	1·54	5	3·07	0·81
Townsville	0·50	30	0·14	0·08
Central Coast.				
Ayr	0·49	27	0·45	Nil
Bowen	0·67	27	Nil	Nil
Charters Towers ...	0·47	27	0·61	0·48
Mackay	1·34	27	1·72	Nil
Proserpine	0·94	11	1·14	Nil
St. Lawrence ...	1·26	27	0·10	0·03
South Coast.				
Biggenden	1·39	14	1·09	0·41
Bundaberg	2·90	27	1·03	0·62
Brisbane	2·31	64	1·74	2·03
Childers	1·76	19	1·64	0·99
Crohamhurst ...	2·85	20	2·16	2·61
Esk	2·11	27	1·12	0·88
Gayndah	1·65	6	0·58	0·55
Gympie	1·97	27	1·66	1·36
Glasshouse M'tains	2·65	6	1·54	2·52
Kilkivan	1·87	27	0·95	1·58
Maryborough ...	2·13	27	1·60	0·68
South Coast—continued:	In.		In.	In.
Nanango	1·76	27	1·20	1·29
Rockhampton ..	1·58	27	0·02	0·08
Woodford	2·73	27	1·19	2·46
Yandina	2·77	21	2·02	2·41
Darling Downs.				
Dalby	1·84	27	1·48	1·24
Emu Vale... ...	1·50	17	2·38	1·12
Jimbour	1·86	24	1·54	1·23
Miles	1·69	27	1·99	1·94
Stanthorpe ...	2·04	27	1·12	1·02
Toowoomba ...	2·06	27	2·38	1·76
Warwick	1·83	27	2·97	0·97
Maranoa.				
Roma	1·40	25	0·82	1·04
State Farms, &c.				
Gatton College ...	1·54	14	1·25	1·00
Gindie	1·23	13	0·38	0·35
Kamerunga Nurs'y	1·35	23	2·71	0·55
Kairi	0·49	3	0·50	0·58
Sugar Experiment Station, Mackay	1·36	16	0·94	Nil
Bungeworgorai ...	0·73	3	0·66	1·18
Warren	...	...	Nil	0·13
Hermitage ...	1·49	7	3·17	0·78

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for July this year and for the same period of 1914, having been compiled from telegraphic reports are subject to revision.

This return was inadvertently omitted from the September issue of the Journal.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

Table showing the Average Rainfall for the Month of August in the Agricultural Districts, together with Total Rainfalls during August, 1915 and 1914, for Comparison.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Aug.	No. of Years' Records.	Aug., 1915.	Aug., 1914.
North Coast.	In.		In.	In.
Atherton	0·91	13	Nil	1·18
Cairns	1·48	27	0·06	4·93
Cardwell	1·16	27	Nil	1·19
Cooktown	1·28	27	0·23	7·22
Herberton	0·65	27	Nil	1·10
Ingham	1·44	22	0·04	0·54
Innisfail	5·30	27	0·43	10·53
Mossman	1·58	5	0·34	2·36
Townsville	0·40	30	0·53	0·03
Central Coast.				
Ayr	0·40	27	0·38	Nil
Bowen	0·68	27	0·51	0·09
Charters Towers ...	0·44	27	Nil	Nil
Mackay	1·19	27	0·88	0·32
Proserpine	0·77	11	0·99	2·13
St. Lawrence ...	1·15	27	0·40	0·28
South Coast.				
Biggenden	1·27	14	1·82	0·44
Bundaberg	1·56	27	1·31	0·36
Brisbane	2·27	64	1·60	0·29
Childers	1·33	19	0·48	0·84
Crohamhurst ...	2·37	20	1·86	2·07
Esk	1·75	27	1·99	0·24
Gayndah	1·22	27	1·32	0·16
Gympie	1·65	27	1·47	1·31
Glasshouse M'tains	1·72	6	1·45	1·13
Kilkivan	1·42	27	1·23	Nil
Maryborough ...	1·59	27	1·21	1·62
South Coast—continued:	In.		In.	In.
Nanango	1·55	27	1·42	0·18
Rockhampton ...	0·97	27	0·41	Nil
Woodford	2·05	27	1·22	0·89
Yandina	2·18	21	0.90	1·73
Darling Downs.				
Dalby	1·26	27	1·18	0·39
Emu Vale	1·36	17	1·72	0·17
Jimbour	1·41	24	2·25	0·37
Miles	1·23	27	1·51	Nil
Stanthorpe ...	1·72	27	1·60	0·31
Toowoomba ...	1·89	27	1·54	0·44
Warwick	1·59	27	1·66	0·15
Maranoa.				
Roma	1·04	25	1·45	Nil
State Farms, &c.				
Gatton College ...	1·49	14	1·62	0·25
Gindie	0·74	13	1·29	Nil
Kamerunga Nurs'y	1·54	23	0·05	3·49
Kairi	0·81	3	Nil	2·24
Sugar Experiment Station, Mackay	0·84	16	1·05	0·21
Bungeworgorai ...	0·40	3	1·20	Nil
Warren	0·12	3	0·18	Nil
Hermitage ...	1·90	7	1·98	Nil

Note.—The averages have been compiled from official data during the periods indicated; but the totals for August this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

RATION FOR A BULL.

Mr. J. C. Brünnich, Agricultural Chemist, in reply to a correspondent, gives the following complete ration for fattening a bull for show purposes:—

Sugar-cane tops require to be fed at the rate of 50 to 60 lb. daily per 1,000 lb. live weight, if the ration is balanced by the addition of 2 lb. of bran and ¾ lb. of linseed meal for every 20 lb. of chop-chop. Should the ration be found to be too laxative, the bran can be replaced by an equal amount of crushed corn for a time.

If possible, the above ration should be supplemented by a little bush hay.

General Notes.

QUEENSLAND AGRICULTURAL COLLEGE.

BURSARIES.

An Examination will be held on the 14th December next in Brisbane and elsewhere, according to where the candidates reside, for Four (4) Bursaries at the Queensland Agricultural College, tenable for three years. Candidates must not be less than 15 or more than 18 years of age on the 1st January, 1916. Nominations close on the 16th November, 1915. Further particulars can be obtained upon application to the Under Secretary, Department of Agriculture and Stock, Brisbane.

THE NORIT PROCESS OF MANUFACTURING WHITE SUGAR.

The "International Sugar Journal" contains an account of a lecture by Dr. A. Wijnberg on "The Norit Process of Manufacturing White Sugar." In this process it is claimed that the colouring matter of the juice is removed by means of so-called 'decolourising carbon' (manufactured under the name of Norit) in the same manner that this is effected by animal charcoal in the sugar refinery. This substance has already been successfully employed for bleaching purposes in various industries, but hitherto has not been used in sugar works, partly on account of its cost and partly because a method of regenerating was not known.

It is now found that the decolourising colour of Norit can be very largely restored by boiling for fifteen minutes with a 3 per cent. solution of caustic soda.

Norit is stated to exert its decolourising action on slightly acid sugar solutions, the colour being only slightly or not at all removed when the solution is alkaline. The author explains this action by reference to the properties of colloids of the nature of pectin which are transformed into larger molecular groupings in feebly acid solutions, but into smaller ones in alkaline. The larger molecular groups are held by the decolourising carbon, while the smaller ones are not.

It is claimed that the decolourising power of Norit is about twenty-five times greater than granular animal charcoal. Its decolourising power is relatively greater in dilute sugar solutions as compared with concentrated ones; hence it is recommended to use Norit to bleach the juice rather than syrup. Norit is stated to possess the advantage of removing pectins and gums from sugar solutions, so that juice decolourised by this means is more easily filtered.

A continuation of the article is promised, in which the practical results obtained in certain factories and refineries will be considered.

TANNING SKINS.

The Sydney " Town and Country" gives the following as a " lightning tanning process":—

The lightning or sulphuric acid process is the quickest method of tanning wallaby, rabbit, and other skins, and is a very simple one. Pour five or six quarts of boiling water over two quarts of bran, and then strain the infusion. Make an equal quantity of salt water, by adding to blood-warm water as much salt as will dissolve. Mix the bran and salt water, and to each gallon of the mixture (when no more than lukewarm) add an ounce of sulphuric acid (H_2SO_4). Immerse the skins in the liquor, stirring them occasionally till tanned, which will be in about twenty minutes. When tanned, rinse in clean water, and hang out in shady place to dry. Pull and stretch them well while drying. By sufficient pulling they can be made quite white. Dry skins should be soaked in warm water before tanning till they are quite soft, and all flesh and grease should be well cleansed from them.

DESTROYING BOX AND SANDAL WOOD SUCKERS.

Mr. H. C. Quodling, Director of Agriculture, advises:—

"Round leaf box is always a difficult class of timber to kill owing to its predisposition to throw up suckers from surface roots, or after ring-barking, and more so when the operation is carried on at the wrong time of the year. The sap must be active. April and May are the months during which ring-barking will be generally satisfactory. Grubbing or cutting down suckers represents a good deal of work, but many persons are prone to grub effectively as the surest course, rather than risk cutting down the suckers, and the splitting of the butt simultaneously, to be followed by the application of arsenical solution.

" Strong plant poison is made up by boiling 2 lb. of arsenic and 1 lb. of caustic soda for an hour in 2 gallons of water—make up to 2 gallons with boiling water. Use a watering can after removing the rose. The spout should be plugged to allow the liquid to ooze out and be absorbed into the split butt."

THE QUEENSLAND COTTON CROP.

Arrangements have again been made by the Department of Agriculture to handle the cotton crop throughout Queensland. The farmers will receive an advance of 1¾d. per lb. on all cotton in seed delivered in Brisbane. The Officers of the Department will gin the cotton and dispose of the clean lint, and if there should be any net profit, after paying all expenses, the amount will be handed over to the grower. It is further announced that the Department will supply suitable seed to any intending grower of cotton, free of cost, and will pay railway freight to the station nearest to the applicant's farm. Seed will be available early in October.

PRICKLY-PEAR IN EGYPT.

The accompanying photograph of a prickly-pear plantation at Heluan, in Egypt, is interesting as indicating that the Egyptians use the plant as food for stock, where, possibly, there is a scarcity of other fodder. The photograph was taken by an officer of the British forces

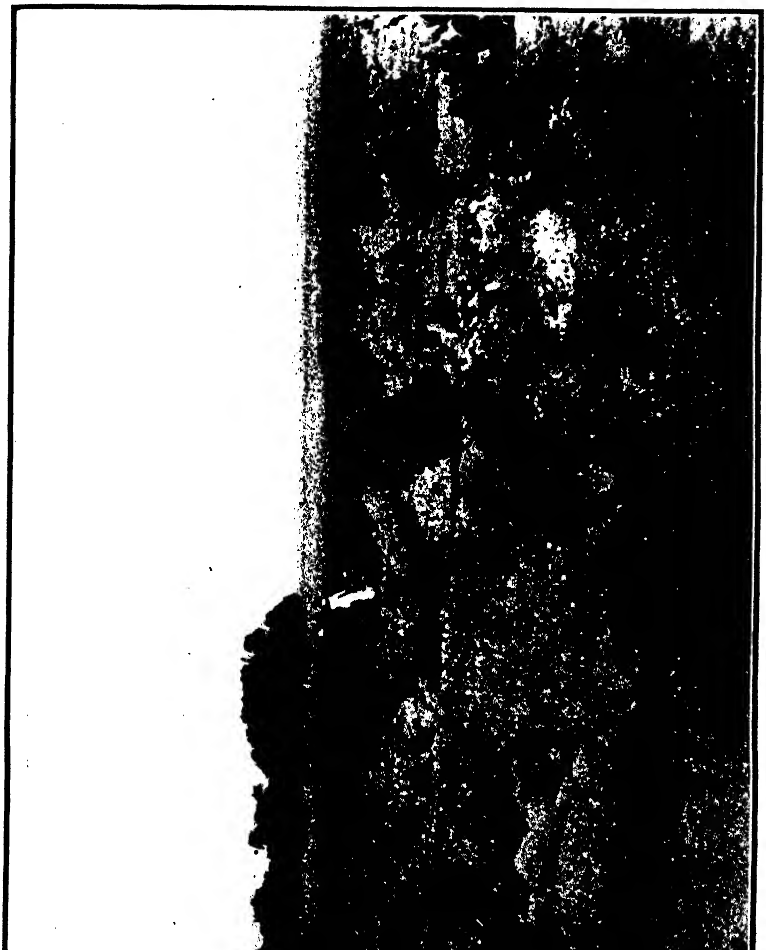

Plate 21.—Prickly-pear Plantation in Egypt.

in Egypt. He did not know, or did not state, what use was made of the plant; but it could only be used as fodder, or for the fruit. We have seen, at Cairo, baskets of prickly-pear fruit for sale in the market. Heluan is a place on the Nile, about 16 miles south of Cairo.

TO KEEP FLIES FROM HORSES' EYES.

The skin around the eyes should be painted daily with the following dressing:—

Spirits of tar, 1 oz.; olive oil, 5 oz.

TO DESTROY ZAMIA PLANTS.

Mr. J. F. Bailey, Government Botanist, says that the usual mode adopted for killing the plant is to chop a notch in the trunk and then bore a large hole from the notch to the centre of the pith. The hole is filled with arsenic, and the plant soon dies.

USEFUL MEDICINES ON THE FARM.

As regards medicines for horses, &c., the most useful on a farm are—Raw linseed oil, turpentine, and baking soda, the dose for a horse being 2 oz. turpentine, 1 pint linseed oil, and 2 oz. baking soda. In severe or doubtful cases the services of a qualified veterinary surgeon, if available, should be requisitioned.

NON-GERMINATION OF PINEAPPLE SEEDS.

With regard to pineapple seeds failing to germinate, Mr. C. Ross, Instructor in Agriculture, states that pineapple seed should be planted immediately after being taken from the fruit. The seed germinates very irregularly, and it is usual for many misses to occur. If sown in light, well-drained loam, properly shaded and watered, a fair proportion should result. There is no secret in raising pineapple seed, and Mr. Ross is at a loss to account for failures.

HOW TO COOK VEGETABLES.

First of all, the vegetables should be thoroughly cleansed. If fresh gathered and perfectly free from insects and dirt, vegetables preserve their colour in boiling much better when not previously wetted. If blighted, or in any respect dirty, remove all that can be removed before wetting—that is, trim away the outside leaves and roots, leaving no more than is to be actually boiled and eaten. This applies to cabbage, broccoli, and cauliflowers. Having carefully trimmed them, let them lie an hour or more in a pan of spring water and salt. Observe to plunge them into the water, not to pump or pour water upon them, which would make them flabby. Immediately before putting them into the saucepan, take them out of the water and shake them well in a colander or thin straining cloth that every drop of cold water may run off. In trimming vegetables do not be too saving; one tough outside leaf will spoil a whole dish; strip till you come to tender quick-grown leaves; and in cabbages shave the stem and also the stalks of the outer leaves. Salad and radishes should be washed in water without salt. Celery requires half an hour or more to soak. A brush, somewhat resembling a plate brush, is very useful in cleaning the root end of the celery.

Green peas, French beans, and broad beans require no washing. They should be cut or shelled just before boiling. It sometimes, however, happens to suit to shell peas an hour or two earlier; if so, they should be covered with the shells, and placed on the stones or bricks in a shady room.

Asparagus, if quite fresh, need not be washed; tie them with bass or tape, in bundles of twenty-five or thirty each, making all the heads lie level, and cut the stalks to an equal length.

Turnip greens, if cleanly gathered and carefully trimmed, need no washing. Only the hearts and stems are to be used. The latter should be skinned. But turnip greens grown on sandy land, especially after heavy rains, require to be washed in several waters.

Spinach should be picked leaf by leaf, and washed in several waters, and afterwards thoroughly drained.

The stalks of white beet for boiling, as well as those of rhubarb for pies or puddings, should be skinned.

Red beetroots should be well washed and scrubbed, but not scraped with a knife, as that would discharge the rich juice and the bright colour. Potatoes and Jerusalem artichokes should be scrubbed with a birch broom or scrubbing-brush and washed very clean, just before boiling. They should not be wetted at all till they are about to be used. Carrots and parsnips should be well scrubbed and washed. After boiling, rub off the skins with a coarse cloth. New potatoes are done in the same manner. In spring, when potatoes become old and specky, it is better to peel them raw, carefully removing the specks. This must be done with a knife. Afterwards rinse the potatoes, and either steam them or boil for mashing or for browning under meat.

Onions, Leeks, and Shalots.—Take off as many coats of the skin as are at all slimy or tough. For roasting onions should not be skinned or washed, but merely wiped from dust. Young spring onions are served with the green tops, merely the roots and one thin skin being removed. Artichokes should be soaked an hour or more before boiling.

Now, with regard to dressing vegetables, one general set of rules may serve for all green vegetables. 1. A tin saucepan that shuts close, large enough to allow plenty of water. 2. The water fast boiling the moment of putting in the vegetables, but not having boiled before nor been allowed to stand on the hob. The quicker the water comes to boil at first, and again when the vegetables are put in, the sooner they become tender, and the better they preserve their colour. 3. A brisk fire that will cause the water to boil up again quickly. 4. A small quantity of common salt to be put in with the vegetables—not before. A tablespoonful of salt is sufficient for a large dressing of greens; half that quantity for peas. 5. The instant the vegetables are put in shut the lid close, and do not lift it up again until it is forced up by rapid boiling; when this is the case, remove it, and do not return it again. 6. When the vegetables are nearly done, have quite ready a colander and slice or wire ladle with which to take them up; do not pour the water through them, but carefully lift them out with the ladle into the colander. 7. Shake them carefully in the colander to drain before putting them into the vegetable dish. Spinach should be pressed between two trenchers.

N.B.—The boiling of green vegetables may be expedited, the colour preserved, and if they are old and tough they may be made tender by putting in with them a small quantity of soda, half a teaspoonful of carbonate of soda, or a bit of washing soda the size of a small hazel-nut, is enough for a moderate dressing. This is not suitable for potatoes or roots in general; it spoils their colour, though it improves that of greens.

Answers to Correspondents.

TO SMOTHER COUCH GRASS.

In reply to a correspondent making inquiries on the subject of a suitable crop to smother couch grass, Mr. H. C. Quodling, Director of Agriculture, advised in August, as follows:—

"Panicum is probably the quickest growing crop for the purpose. Some trials carried out at the Agricultural College when there was a plentiful supply of moisture and warmth, a crop of panicum matured in seven weeks from the date the seed was sown, and gave a return equal to 8 tons of green fodder per acre. It may be pointed out that everything was in favour of this crop, particularly in the matter of preparation of the land, which had been lying fallow for some time previously. Siberian millet is not as quick a grower as panicum, but it spreads and stools to a greater extent. Japanese millet can also be recommended as a smothering crop, but it must be understood that all of these varieties revel in heat and moisture, and at this time of the year it is unlikely that you will get the same growth and progress as in the rainy season. Cowpeas (black for preference) are favoured as a smothering crop for couch, but it is not to be expected that they will get ahead of the grass unless the latter is kept well in check before planting time. Couch destruction is brought about effectually by shallow cultivation during the warm weather, keeping the grass on the surface, and knocking it about with implements to expose the roots to the drying action of the sun."

SEED OF A GRAFTED ORANGE.

"Orchardist," Wolvi, Gympie—

Your question as to whether the seed of a grafted orange will produce fruit, or go back to the original stock on which the scion was grafted, was submitted to the Director of Fruit Culture, Mr. A. H. Benson, who states that the seed from a grafted orange tree, if sown, will produce an orange, not necessarily, however, of the same type as its parent, as there is always the danger of inoculation by bees or other insects. It is not possible for the seed of an orange mated, say, on a lemon or citron stock to produce a lemon or citron. Copies of Mr. Benson's Bulletin on Citrus Culture and Pineapple Growing have been forwarded to you, and in them you will find answers to the questions on which you desire information. It would certainly be advisable to have the soil analysed. Directions for the collection of samples and scale of fees payable have been also sent to you. Send the samples of soil to the Agricultural Chemist, Department of Agriculture and Stock.

The planting seasons for Citrus fruits in the Southern coast districts are from May to August, and again in February. It is not too late to plant during this month (September) if the weather should prove favourable.

DESTRUCTION OF ANTS.

We frequently receive letters asking for a remedy against ants of all kinds. With a view to satisfying inquiries we published in the issue of this Journal for November, 1913, several remedies more or less effective in dealing with the most common varieties of ants. These were:—

DESTRUCTION OF ANT HILLS.

As the hot weather approaches, those pests of the State, ants of all sorts and descriptions, become lively, and begin to infest house and field. Then, on all sides, the question is heard: "How can we get rid of the ants?"

In the case of the extensive "antdoms" of the blue meat ant, a good way to exterminate them is to cover the gravelly nests with weed chippings from the garden. This proceeding appears greatly to trouble the insects, probably because the dry weeds prevent them from safely depositing the quantities of small stones and gravel they carry up from below the surface of the soil.

Failing this remedy, the best method of dealing with these ants in a large nest is to make several holes with a bar or broom handle to the depth of a few inches in different parts of their habitation. Pour into each hole about a tablespoonful of carbon bi-sulphide, and then cover the whole nest with a blanket. The heavy fumes of the insecticide will permeate the ant hill, killing all insect life. The operation may be made more effective by exploding the vapour under the blanket by the aid of a light on the end of a pole. This drives the poisonous fumes throughout the nest, rendering them more fatal to the inmates. The best time for this treatment is towards the evening, when most of the ants will be at home.

SOLDIER AND JUMPER ANTS

can be effectually destroyed by this process.

Another good remedy is to pour half a pint of gasoline into the hill or nest, and set it afire. The gasoline will instantly spread through all the galleries of the nest, and, as the heat on the surface increases, the gas will generate in the utmost recesses and the fire will cook the ants. Half a pint of gasoline will burn from three to eight hours, and every ant in the nest, or attempting to enter, will be destroyed.

TO CLEANSE A CUPBOARD

infested with red or black ants, all the shelves should be washed with carbolic acid and water, or carbolic soap. If the scent of the carbolic is offensive, as it is to some persons, use the following:—A large lump of ammonia dissolved in hot water, and more cold water added. The proportion is—ammonia the size of a hen's egg to a quart of water. Brush the shelves well over with it. The ants will quickly leave, as they dislike the scent of ammonia.

TO KEEP ANTS AWAY FROM TREES.

Take White Lime (slaked)	6 quarts.
Kerosene oil	½ pint.
Turpentine	1 wineglass.
Soft soap	5 lb.
Cow manure	3 quarts.
Water	16 quarts.

Mix the whole thoroughly together, and apply freely with a paint brush to the trunks of trees or shrubs.

It is said that trees can be protected against ants by saturating woollen strings with castor oil, and tying them tightly round the trunk. The ants go up as far as the strings, but none will cross them. Cotton strings will not do. Woollen yarn must be used.

TO GET RID OF BLACK ANTS.

Mix 10 parts of sugar with 100 parts of water, and boil. Cool, and then add 1 part of tartar emetic, and stir. Set this about in tins covered with muslin or wire netting. A very similar method is to use in exactly the same way a mixture of 1 oz. of jam or syrup and 10 grains of finely powdered corrosive sublimate.

Another remedy, involving no poison, is to soak a piece of sponge in sweetened water. When it is full of ants, drop it into boiling water, and sweeten afresh for a second lot of ants. Ants are curiously intelligent when once they have grasped the idea; so they keep away.

A third remedy: Mix flour, sugar, and arsenic to the consistency of putty with water, and place pieces of the mixture about the nests of the ants. If an examination is made in a few days after using this remedy, hundreds of dead ants will be found in the vicinity of the poison; and it is very unlikely that the ants will reappear on a spot where the mixture has been used.

TO PREVENT ANTS CLIMBING FRUIT TREES.

If chalk is rubbed on the bark of a tree, it will absolutely prevent ants from climbing. If they are above it, they fall the instant they set foot on the chalk when descending. They appear to lose their foothold. The correspondent who supplies this information mentions his experiment with a nectarine tree which was covered with black aphis. Observing that there was a continuous stream of black ants ascending and descending, he smoothed the bark of the steam to a width of about 6 or 7 in., and rubbed this space with chalk. The chalk was renewed from time to time as it fell or was washed off. That year there was not an aphis or black leaf on the tree, nor had there been any since. The ants, cut off from their food supply, were exterminated. "A chalk ring," he says, "drawn round a sugar ants' nest is equally effective." This is worth a trial, as, if successful, chalking the legs of tables and meat safes would preserve the contents from the ants.

Another way of preventing ants from climbing is said to be cheap and effective. Tie a rabbit skin (upside down, tail up the tree), fur

outwards, tightly round the stem. The ants start to climb up the fur, and as they reach the end of each single hair, the hair drops and lets them down. The ants always give it us as a bad job.

REMEDIES FOR WHITE ANTS ATTACKING LIVING TREES.

There are two ways in which the pests may be got rid of—one by arsenical poisoning; the other by the use of bisulphide of carbon, as already described. For the first plan, get 3d. worth of arsenic, and pound it as fine as flour. Next, collect as many ants as possible, mix the ants with the arsenic, some molasses, and a little soil. Make this into a ball, and place it near the ants' nest. The living ants will devour the dead ones, and their followers will devour them. Thus there will be an end of them.

A good remedy is apterite, which is destructive to most insect life when chipped into the ground, and is not harmful to plants.

Sugar and arsenic spread between slips of pine wood, and covered with an inch of soil, is a good trap for white ants.

GREEN HEAD ANTS.

These are most difficult to deal with, as they make their nests in inaccessible places and run long galleries out to some distance. Unless the nests can be located and bisulphide poured into them, there is little hope of getting rid of them.

ANT EXTERMINATION GENERALLY.

For the extirpation of ants the following remedies are good. To be effective, they require attention and perseverance. It is well to find their main burrow or nest, if possible. Arsenic is sure destruction to them, but it is dangerous to handle:—

Air-slaked lime plentifully dusted in warm dry weather over and around the hills, or in the house or other places infested, will cause the ants to vacate them in a short time.

Snuff: Dust a little snuff upon the floor of the rooms or pantry.

Draw a thick chalk line around a smooth tree or across an upright board or post, and they will not pass over it.

Camphor: Put a piece of camphor, the size of a filbert nut, into 2 quarts of hot water. When cold, apply to pot and other plants, and the insects will be driven off without injury to the plants.

Mix together 1 part of calomel and 10 parts of finely powdered white sugar, and lay it in little heaps about their nests and runs. The ants will eat it and die.

Coal oil, mixed with six times its bulk of water, sprinkled over the nests every few days, will kill and drive them away.

Pans or saucers, nearly filled with honey or sweet oil, attract ants, and they are drowned in it.

Flowers of sulphur, ½ lb.; potash, 4 oz. Set in an earthen vessel over the fire until dissolved and united. Afterwards beat to a powder.

Infuse a little of the powder in water and sprinkle in places infested with ants.

To Destroy Black Ants: A few leaves of green wormwood scattered among the haunts of black ants will drive them away.

Red Ants: Powdered borax sprinkled around will exterminate both red and black ants.

Make holes in the ant hills, 6 in. deep and 1 ft. apart, with an iron or zinc tube fitted with a wooden stake. Withdraw the stake. Pour 1 tablespoonful of bisulphide of carbon down the tube. Withdraw the tube and stop the hole immediately. Bisulphide of carbon is very inflammable.

RECORD PRICE FOR A PIG.

A correspondent writes from Tinana, Maryborough, that, at the monthly sales held on the 7th September, high prices ruled throughout for pigs, the reason being probably, the very great demand by the bacon factories. Very brisk bidding took place for a fine "backfatter," sold on behalf of Mr. Chas. Fortey, of Newtown. The bids ran up to £7 17s. 6d., which is easily a record for a pig in Queensland sold for commercial purposes. It would be interesting to know how this pig panned out in the way of bacon, hams, and sundries in the factory.

A SYMPTOM OF WORMS IN SHEEP.

A correspondent at Cloncurry, who last year lost 20 per cent. of his lambs, noticed that, at about from three to six months old, they developed a lump under the throat, and wrote to the Department for advice on the matter. Mr. W. G. Brown, Instructor in Sheep and Wool, advised as follows:—

One of the most decisive symptoms of worms in sheep is the lump under the jaw. The fact that lambs from four to six months old die from this complaint is a very strong corroboration of intestinal or stomach worms. If these lambs be drenched with a suitable drench, they should not die. If the fourth stomach were opened, twisted wire-worms in thousands would be found. Mr. Brown sent directions for making the drench, which, he said, would be found so effective that it was a certainty that no drenched lambs would die of stomach worms.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

Computed by D. EGLINTON, F.R.A.S.

Date.	September.		October.		November.		December.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·4	5·33	5·30	5·47	4·59	6·4	4·46	6·27
2	6·3	5·33	5·29	5·48	4·58	6·4	4·46	6·28
3	6·2	5·34	5·28	5·48	4·58	6·5	4·46	6·28
4	6·1	5·34	5·27	5·49	4·57	6·6	4·46	6·29
5	6·0	5·35	5·26	5·49	4·57	6·6	4·46	6·29
6	5·59	5·35	5·25	5·50	4·56	6·7	4·46	6·30
7	5·58	5·36	5·24	5·50	4·55	6·8	4·46	6·30
8	5·57	5·36	5·23	5·51	4·54	6·9	4·47	6·31
9	5·56	5·37	5·22	5·51	4·53	6·10	4·47	6·32
10	5·55	5·37	5·21	5·52	4·53	6·11	4·47	6·33
11	5·53	5·38	5·20	5·52	4·52	6·11	4·47	6·34
12	5·52	5·38	5·19	5·53	4·51	6·12	4·47	6·35
13	5·50	5·38	5·18	5·53	4·51	6·12	4·48	6·36
14	5·49	5·39	5·17	5·54	4·50	6·13	4·48	6·36
15	5·48	5·39	5·16	5·54	4·50	6·14	4·48	6·37
16	5·46	5·40	5·15	5·55	4·49	6·15	4·49	6·38
17	5·45	5·40	5·14	5·55	4·49	6·16	4·49	6·38
18	5·44	5·41	5·13	5·56	4·48	6·16	4·50	6·39
19	5·43	5·41	5·12	5·56	4·48	6·17	4·50	6·39
20	5·42	5·42	5·11	5·57	4·48	6·18	4·51	6·40
21	5·41	5·42	5·10	5·57	4·48	6·19	4·51	6·40
22	5·40	5·43	5·9	5·58	4·47	6·20	4·52	6·41
23	5·39	5·43	5·8	5·58	4·47	6·21	4·52	6·41
24	5·37	5·44	5·7	5·59	4·47	6·21	4·53	6·41
25	5·36	5·44	5·6	5·59	4·47	6·22	4·53	6·42
26	5·35	5·45	5·5	6·0	4·47	6·23	4·54	6·42
27	5·33	5·45	5·4	6·0	4·47	6·24	4·54	6·42
28	5·32	5·46	5·3	6·1	4·47	6·25	4·55	6·43
29	5·31	5·46	5·2	6·1	4·47	6·26	4·55	6·43
30	5·30	5·47	5·1	6·2	4·47	6·27	4·56	6·44
31	...	...	5·0	6·3	...	...	4·56	6·44

Phases of the Moon, 1915.

On or about the 150th Meridian, East Long.

			H.	M.	
2 Sept.	☽	Last Quarter	12	56	a.m.
9 „	●	New Moon	8	52	p.m.
16 „	☾	First Quarter	5	21	„
23 „	○	Full Moon	7	35	„

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 14th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

1 Oct.	☽	Last Quarter	7	44	p.m.
9 „	●	New Moon	7	42	a.m.
15 „	☾	First Quarter	11	51	p.m.
23 „	○	Full Moon	10	15	a.m.
31 „	☽	Last Quarter	2	39	p.m.

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

7 Nov.	●	New Moon	5	52	p.m.
14 „	☾	First Quarter	9	3	a.m.
22 „	○	Full Moon	3	36	„
30 „	☽	Last Quarter	8	10	„

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

7 Dec.	●	New Moon	4	3	a.m.
13 „	☾	First Quarter	9	38	p.m.
25 „	○	Full Moon	10	52	„
29 „	☽	Last Quarter	10	59	„

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October it will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1st December it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR SEPTEMBER, 1915.

Article.		SEPTEMBER. Prices.
Bacon	lb.	1s. 1d. to 1s. 2½d.
Bran	ton	£6 15s.
Broom Millet	,,	...
Butter	cwt.	140s.
Chaff, Mixed	ton	£11 to £12
Chaff, Oaten	,,	£12 to £14 10s.
Chaff, Lucerne	,,	£15 to £20
Chaff, Wheaten	,,	£5 10s. to £10
Cheese	lb.	10d. to 10½d.
Flour	ton	£17 5s.
Hams	lb.	1s. 1d. to 1s. 2d.
Hay, Oaten	ton	£16
Hay, Lucerne	,,	£9 to £15
Honey	lb.	3½d. to 4d.
Maize	bush.	5s. 7d.
Oats	,,	6s. 3d to 7s. 6d.
Onions	ton	£10 10s.
Peanuts	lb.	3d. to 3½d.
Pollard	ton	£7 10s.
Potatoes	,,	£11 to £13 10s.
Potatoes (Sweet)	cwt.	6s. 9d. to 7s. 9d.
Pumpkins	ton	£6 to £8
Eggs	doz.	11½d. to 1s.
Fowls	pair	4s. 9d. to 6s.
Ducks, English	,,	4s. to 4s. 3d.
Ducks, Muscovy	,,	5s. to 6s.
Geese	,,	...
Turkeys (Hens)	,,	8s. 6d.
Turkeys (Gobblers)	,,	16s. to 18s.
Wheat	bush.	9s.

VEGETABLES.

Cabbages, per dozen	6d. to 2s.
Cauliflowers, per dozen	1s. to 5s. 6d.
Beans, per sugar bag	3s. to 4s.
Beetroot, per dozen bunches	6d. to 9d.
Carrots, per dozen bunches	9d. to 1s. 3d.
Chocos, per quarter-case	1s. 9d. to 2s. 6d.
Cucumbers, per dozen	...
Custard Marrows, per dozen	2s. 6d. to 4s.
Vegetable Marrows, per dozen	2s. 6d. to 4s.
Lettuce, per dozen	...
Peas, per sugar bag	1s. to 2s. 6d.
Parsnips, per dozen bunches	1s. to 1s. 3d.
Celery, per dozen bunches	10d. to 1s. 6d.
Sweet Potatoes, per cwt.	6s. 9d. to 7s. 6d.
Table Pumpkins, per cwt.	7s. 6d. to 8s.
Tomatoes, per quarter-case	2s. to 7s.
Turnips, per dozen bunches	6d. to 9d.
Rhubarb, per bundle	1s. to 1s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	SEPTEMBER. Prices.
Bananas (Queensland), per case	10s. to 12s.
Bananas (Fiji), per case	17s. to 18s. 6d.
Bananas (G.M.), per case	20s. to 23s.
Mandarins, per case	5s. to 7s.
Oranges (Navel), per case	6s. to 8s.
Oranges (other), per case	5s. to 7s.
Passion Fruit (Local), per half-case	2s. to 10s.
Lemons, per bushel case	3s. to 5s. 6d.
Papaw Apples, per half-case	...
Pineapples (Queens), per case	5s. to 7s. 6d.
Pineapples (Ripleys), per case	4s. to 6s.
Pineapples (Common), per case	4s. to 6s.
Strawberries (Queensland) per tray	3s. to 5s.
Tomatoes, per quarter-case	5s. to 9s.
Cucumbers, per case	6s. to 8s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	SEPTEMBER. Prices.
Apples (Tasmanian), per case	7s. to 10s.
Apples (Croftons), per case	14s.
Apples, Cooking, per case	6s. to 10s.
Bananas (Cavendish), per dozen	2d. to 5d.
Bananas (Sugar), per dozen	1½d. to 3d.
Cape Gooseberries, per quarter-case	5s. to 7s. 6d.
Cocoanuts, per sack	12s. to 15s.
Custard Apples, per quarter-case	5s. to 8s.
Granadillas, per quarter-case	...
Lemons (Lisbon), per case	5s. to 7s. 6d.
Limes (Choice), per quarter-case	2s. to 3s. 6d.
Mandarins, per half-case	6s. to 8s.
Oranges(Navel), per case	6s. to 8s.
Oranges (other), per case	3s. 6d. to 5s.
Papaw Apples, per quarter case	1s. to 2s. 6d.
Papaw Apples (Prime), per quarter-case	3s.
Passion Fruit, per case	6s. 6d. to 7s. 6d.
Peanuts, per pound...	3d. to 4d.
Rosellas, per sugar bag	...
Pineapples (Ripley), per dozen	1s. 9d. to 3s. 6d.
Pineapples (Rough), per dozen	9d. to 1s. 6d.
Pineapples (Smooth), per dozen	1s. 9d. to 3s. 6d.
Strawberries, per dozen pint boxes	3s. 6d. to 7s.
Strawberries, per tray	...
Tomatoes, per quarter-case	2s. to 5s. 6d.

TOP PRICES, ENOGGERA YARDS, AUGUST, 1915.

Animal.	AUGUST. Prices.
Bullocks	£31 to £41 5s.
Cows	£14 to £16 17s. 6d.
Merino Wethers	54s. 9d.
Crossbred Wethers	63s.
Merino Ewes	46s. 9d.
Crossbred Ewes	50s.
Lambs	44s. 6d.
Pigs (Porkers)	44s. 6d.

EXHIBITION PRICES.

Animal.	AUGUST. Prices.
Bullock (Champion)	£46
Bullock (Guessing)	£37
Bullock	£39
Cows (Champion)	£20 5s.
Cows	£22 5s.
Crossbred Wethers	81s.
Merino Wethers	55s. 6d.
Crossbred Ewes	54s.
Lambs (Crossbreds)	51s.

LONDON QUOTATIONS.

London, 11th September.—Danish butter is quoted at 174s. to 176s. per cwt.

The Liverpool quotation for middling American cotton, September-October shipment, is 5·94½d. per lb.

Jute, September-October shipment from Calcutta, £26 per ton.

Hemp is dull. October-December shipment, £33 per ton.

Mexican Sisal: It is stated in Messrs. Landauer and Co.'s report for 11th August (London) that, owing to a sharp fall in exchange and freight, prices have moved in favour of buyers. Offers have been received for forward shipment at £34 per ton for fair average quality. No business had apparently been concluded, but a small parcel of good quality in store was offering at £36 per ton. From statistics to hand it was to be noted that the shipments of sisal hemp from the Port of Progreso (Mexico) during the month of June reached the record figure of 132,356 bales against 89,208 bales during June, 1914.

Stocks on hand in Progreso, 30th June, 1915 .. .. 81,912 bales.

Stocks on hand in Progreso, 30th June, 1914 .. .. 28,567 bales.

Shipments of sisal this year presumably only reach the United States. The market was quiet for Mauritius hemp, spot values remaining at £33 to £33 10s. for prime, £31 to £31 10s. for good fair, and £30 to £30 10s. for ordinary grades.

Rubber, fine hard Para, 2s. 4⅜d. per lb.; plantation, first latex crepe, 2s. 4d.; smoked sheet, 2s. 4d.

Copra, South Sea, September-October shipment, £22 15s. per ton.

Orchard Notes for November.

THE SOUTHERN COAST DISTRICTS.

November is somewhat of an off month for fruit, as the crop of strawberries is about over; pineapples, with the exception of a few off season fruit, are not ready for marketing; and citrus fruits of all sorts, with the exception of those grown in the latest districts, are now over. Bananas should, however, be improving, particularly if the season is favourable.

The most important work of the month is the cultivation of the orchard, as, in order to retain moisture in the soil, it is essential that the soil be kept in a fine state of tilth. Where land is liable to wash, breaks should be left between the fine-worked land, or, even better, a good break of cowpea or other leguminous crop, valuable for producing nitrogen and humus, should be grown. All fruit pests should be attended to; cyaniding can be carried out where necessary, and is especially useful now in the case of the Red, Purple Mussel, Circular Black, and Glover Scales. Fruit-fly should be systematically fought; all infested plums, peaches, guavas, or other fruits should be gathered and destroyed, so as to prevent the spread of the pest. Sucking bugs of all sorts should be gathered and destroyed, the egg-clusters, as well as the immature and mature insects, being destroyed. Hand-gathering is as good a plan as any. Fig beetles should be destroyed by spraying with Kedzie's mixture; and the egg-clusters should be destroyed whenever found.

Bananas and pineapples can be planted during the month, taking care, in the case of the pineapples, not to set out suckers that will immediately throw out a fruit, but those that will become firmly established before they fruit. Examine the vineyard carefully, and keep it well worked. Look out for Oïdium and Black Spot, and treat for same as recommended in the Orchard Notes of the two previous months.

Early ripening grapes will be reaching maturity towards the end of the month; but few, if any, will be ripe. In any case do not market too immature fruit; rather wait a few days longer, till it is fit to eat.

THE TROPICAL COAST DISTRICTS.

The main crop of pineapples will ripen during the month; and if gathered at the right time—viz., when fully developed, but not turned colour—they will carry all right South, if carefully handled and well packed. Papaws and granadillas are still in season, and will meet with a good Southern demand; they must be packed in cases containing only a single layer of fruit, and should be sent in the cool chamber. I am certain that a good market can be got for these fruits in both Melbourne and Sydney, particularly at this time of the year, when their winter fruits are off and their summer fruits are not yet on.

Watch bananas carefully for fly. Keep the orchards well cultivated.

Only ship good mangoes South; far too much rubbish is sent to Brisbane. Good mangoes will pay to pack properly, but the common sorts, which predominate to an enormous extent, will barely pay freight, if there is a good crop. The canning of good types of fibreless mangoes of good flavour is well worth taking up commercially in the North, as a ready sale for the canned fruits can be obtained.

As in the Southern Coast districts, all fruit pests should be systematically fought, and the orchard should be kept in a good state of tilth, as, once the wet season starts, there is little chance of cleaning up weeds and rubbish of all kinds, or of cultivating and sweetening the soil.

THE SOUTHERN AND CENTRAL TABLELANDS.

The earlier kinds of summer fruits, such as cherries, will ripen during the month. See that, if fruit-fly makes its appearance, it is systematically fought.

Look out for Codling Moth, and continue the sprayings with Kedzie's mixture.

Look out carefully for any San José scale that may have escaped the winter spraying, as, if the trees are sprayed whilst the young are hatching out, the bulk of the insects are killed and little damage is done either to tree or fruit.

The sulphide of soda spray is one of the best to use now. Keep Woolly Aphis in check, should it make its appearance, using the resin washes; or, if it and San José scale are both present, use the sulphide of soda spray.

Watch the vineyards carefully for Black Spot and Oïdium. Keep the orchard and vineyard well cultivated, so as to retain all the moisture in the soil required for the growth of the tree and development of the fruit. In the warmer parts, irrigate when necessary, following the irrigation by deep and systematic cultivation.

See that grape vines have plenty of foliage to protect the ripening fruit from sun scald, but yet not so dense a foliage as to induce Oïdium or Black Spot. Look out for Red Scale on citrus trees, and cyanide to check same. Look out for fruit-fly in the early ripening fruits, and gather and destroy all that may be so affected.

Farm and Garden Notes for November.

FIELD.—Under ordinarily favourable conditions, harvesting the wheat and barley crops may now begin. Those who have oats for hay should cut it when the grain has formed, but before it is ripe, for then the plant is in its most nourishing condition. Destroy caterpillars on tobacco plants, and top the latter so as to throw all the strength into the leaves. Keep down the weeds, which will now try to make headway;

earth up any growing crops requiring the operation; sow maize, imphee, setaria, kafir corn, teosinte, sorghum, &c. Plant sweet potatoes, sisal hemp, yams, peanuts, and ginger.

KITCHEN GARDEN.—Why do so few gardeners and farmers grow their own vegetables? This is a question frequently asked by visitors to the farming districts. The reason probably is, that vegetables require a good deal of care and attention, which means also a good deal of time taken from the ordinary farm work. In many cases it pays the farmer better to buy many kinds of vegetables than to grow them himself. The only vegetables grown on many fine farms are cabbages and pumpkins, not to class potatoes under the head. Many people have an idea that European vegetables cannot be grown during the hot summer months, but this is a great fallacy; the Chinese gardeners supply the town with all kinds of vegetables, except, perhaps, cauliflowers, during the whole of the summer. It is, therefore, clear that, by constant work, plenty of manure, water, and some shade for seedlings, most vegetables can be produced during the hot months from November to March. If your ground has been trenched or deeply dug and well worked, the advantages will be seen during the coming months. It does not pay to work shallow-dug ground. When sowing and planting during this month, give plenty of room between the rows and the plants, otherwise they will be drawn up and worthless, and keep the ground open by constant forking and hoeing. Thin out melon and cucumber plants. It is a good plan to peg down the vines; they will then not be blown about by the wind; they will take root at intervals, and thus help the main stalk. Give plenty of water to tomatoes planted out last month. They should also be mulched. Sow cabbage, French beans, melons, lettuce, radishes, pumpkins, cucumbers, marrows, rosellas, &c.; and transplant for succession in calm cloudy weather.

FLOWER GARDEN.—Stake any dahlias which may be now above ground, and plant out the bulbs which were stored in a moist place. If the weaker bulbs are reserved, they will come in for autumn planting. Take up all bulbs which have done flowering, and store them in a dry place. Winter-flowering plants will have gone off almost; still, the garden should be in full bloom, and will well repay the trouble bestowed on it, and a little fertiliser given as a top-dressing will assist the plants to bloom and look well for a longer time than if they were neglected. Give weak liquid manure to chrysanthemums, and allow no suckers to grow till the plants have done flowering. Take up narcissi. Do not store them, but plant them at once in new situations. Sow anthirrhinum, balsam, zinnia, summer chrysanthemum, calliopsis, and nemophila.

QUEENSLAND AGRICULTURAL JOURNAL

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Agriculture.

THE ADVANTAGES AND OBJECTS OF AGRICULTURAL CONFERENCES.

For some years, in the early days of agriculture in the State of Queensland, meetings of agriculturists were held in different centres, notably in East Moreton, under the auspices of the East Moreton Farmers' Association, which may be said to have formed the nucleus of the present splendid National Agricultural and Industrial Association of Queensland. In his introductory speech at the Agricultural Conference at Bundaberg in May, 1891, Mr. Peter McLean, who was at that time Under Secretary for Agriculture, said "that the gatherings of farmers in the past had been evidently more for amusement than for education. The present conference, and others recently held, had for their object the education, not the amusement, of those who took part in them, or who read the proceedings generally published afterwards. The first conference, held at Beenleigh, had been a most gratifying success,

and the papers read and the discussions thereon had been printed and widely circulated in Queensland and the sister colonies. The department was desirous, by means of these gatherings, to disseminate useful and practical information upon agricultural subjects. This was attained in two ways; first, by opening up a subject by the reading of a paper upon it, but more particularly by the discussion which these papers stimulated. The proceedings would be printed and circulated in the different parts of the colony. The discussions are very often found to be the most important part of the conference. The object of the papers was principally to broach the subject, touching upon the most salient points. It was found at Beenleigh that the discussions elicited more information than was given in the papers read by delegates. Therefore the circulation of the reports of the conferences would do a great deal of good. He (Mr. McLean) had been identified with farming for twenty-seven years, and therefore had some experience of the value of such aid as it was the object of these conferences to offer. There had existed for too long a time an apathy in connection with farming which was dangerous to the industry. The object of the department was to break down this apathy and isolation, and also to bring farmers together to exchange ideas and experiences on the great question of the farming industry. He held that they were just on the fringe of this important question of agriculture. There was no occupation or profession where more intelligence was required than in farming. There was more to be understood, and greater scope for investigation, in agriculture than in any other occupation on which human attention is bent. The Department of Agriculture may do a great deal, and indeed has done something, but unless they could get the sympathy and assistance of the farmers the department could not succeed. These gatherings would break down the apathy and disturb the isolation which, unfortunately, existed amongst farmers. Let them unite, then, and make the conference a success, and compel them to acknowledge that it was good for them to be there."

It was at this conference that the first mention (as we believe) of dynamite being used in the cultivation of orange-trees was made by Mr. J. Falconer. He called the operation

SUBSOILING WITH DYNAMITE.

Once at Moolboolaman he had an orange-tree which was badly blighted. He bored a hole to a depth of 9 inches with an auger disagonally towards the roots, cleaned the hole out, put in a charge of dynamite, fixed the fuse, and exploded the dynamite. The soil was loosened for 20 feet round the tree, and in three weeks the blight had disappeared and the tree became healthy and bore well ever afterwards.

This statement was received with laughter and incredulity, nothing being then known of an operation which, of late years, has been very largely employed in Queensland in subsoiling land amongst growing fruit trees, and in preparing the holes for new plantations. If an Agricultural Conference were held to-day, much valuable information would be given on the beneficial effect of using explosives in the orchard, and there would neither be laughter nor incredulity exhibited.

COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

TOBACCO.

This crop requires a light, sandy loam, containing a large amount of humus. As it is a very exhaustive crop, it must get a liberal supply of artificial fertilisers. The texture, aroma, and burning quality of the leaf is greatly influenced by the fertilisers used, and rank, coarse, organic manures, and also manures containing chlorides, like kainit and muriate of potash, must be avoided.

An artificial fertiliser containing from 4 to 5 per cent. water or citrate soluble phosphoric acid, 5 per cent. of nitrogen, and 8 to 10 per cent. of potash (as sulphate) should be used in quantities from 6 to 10 cwt. per acre, and even such large amounts as 2,000 lb. of this mixture per acre have been found profitable in some of the tobacco countries.

The following fertiliser mixtures may also be used, increasing the amounts on poorer classes of soils:—

(1.) 1 to 2 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
1 to 2 cwt. nitrate of lime or dried blood } per acre;

(2.) 2 to 3 cwt. Thomas phosphate
1½ to 3 cwt. sulphate of potash
1 to 2 cwt. nitrolim or nitrate of soda } per acre;

(3.) 1 to 2 cwt. superphosphate
1½ to 3 cwt. sulphate of potash
2 to 6 cwt. cotton-seed meal } per acre.

TOMATOES.

Tomatoes are frequently grown by orchardists in their orchards before they come into bearing. The fact that tomatoes are very gross feeders should never be lost sight of, and they undoubtedly impoverish the soil very rapidly, unless artificial fertilisers are supplied to the ground when planting.

Tomatoes do best on rich sandy loam, well drained and subsoiled. Use an artificial fertiliser containing 7 to 10 per cent. phosphoric acid, 8 per cent. potash, and 4 per cent. nitrogen, and apply at the rate of 8 to 10 cwt. per acre, or 8 to 10 lb. per 43 square yards, or 3 to 4 oz. per square yard.

Complete fertilisers can also be made up as follows:—

4 to 5 cwt. superphosphate
1 to 2 cwt. sulphate of potash
1 to 1½ cwt. nitrolim or sulphate of ammonia or nitrate of soda } per acre;

or,

3 cwt. fine bonedust 2 cwt. superphosphate 1½ cwt. sulphate of potash 2 cwt. nitrate of lime or nitrate of soda	per acre,

the nitrate of lime or nitrate of soda to be applied as topdressing in two lots at beginning and during growing seasons.

TURNIPS.

Turnips, like beets, require a fairly rich, well-worked soil, and the same class of artificial fertiliser.

WATER MELONS.

Use the fertilisers recommended for cucumbers or for marrows.

WHEAT.

Wheat may be grown on different classes of soil, and very large areas of country in Queensland are eminently suited for the culture of wheat. A clayey loam, with a fairly porous clayey subsoil, combined with a rather dry climate, gives the best results.

The demand for artificial fertilisers is only moderate, still light dressings with complete manures have given in many localities excellent results. In South Australia, the application of small amounts of superphosphate, ½ cwt. per acre, has increased the yield very considerably.

A complete fertiliser for wheat could be made up as follows:—

½ to 1½ cwt. superphosphate ½ to 1 cwt. sulphate of potash ½ to 1 cwt. nitrate of lime, or nitrolim, or nitrate of soda	per acre,

or a fertiliser containing 7 to 8 per cent. water soluble phosphoric acid, 4 per cent. of potash, and 3 to 4 per cent. of nitrogen, may be used at the rate of 1 to 3 cwt. per acre.

EGG PLANTS OR EGG FRUITS.

This vegetable is as hardy and easy to grow as the closely allied tomato, and requires a fairly rich sandy loam.

Apply per acre from 8 to 12 cwt. of a fertiliser containing 5 to 7 per cent. soluble phosphoric acid, 4 per cent. nitrogen, and 8 to 9 per cent. of potash, or use the following mixture:—

4 to 6 cwt. of superphosphate 1½ to 2 cwt. of sulphate of potash 1½ to 2 cwt. of nitrolim or sulphate of ammonia or nitrate of soda	per acre;

or the same quantities in pounds to every 43 square yards.

ORCHARD.

APPLES.

Apple trees prefer a fairly rich sandy loam, and also do well on the coarse sandy granitic soil of our coastal tablelands, in the Southern portions in which the winter temperature is low enough to give the trees a complete rest during the winter months. Our orchard soils are generally fairly rich in potash, but rather deficient in phosphoric acid, nitrogen, and humus; and mulching of the trees is of utmost importance.

A good fertiliser for apple trees grown on our sandy soils of average quality would be—

1½ lb. bonemeal	per tree.
1½ lb. superphosphate	
1 lb. sulphate of potash	
1 lb. nitrolim	

This quantity is for young trees; for large trees over eight years old, the quantity can be about doubled.

APRICOTS.

This fruit tree requires a fairly rich, well-drained, sandy loam, and does very well on our coastal downs country.

A tree in full bearing requires an annual application of—

3 lb. superphosphate	per tree.
1½ lb. sulphate of potash	
1 lb. nitrolim	

Young trees can be started with one quarter of this amount, gradually increasing the quantity from year to year until the above amount is reached. For very old big trees, grown on poorer soil, the quantity may be safely increased to 7 or 8 lb. per tree.

BANANAS.

Bananas require a deep, well-drained scrub soil or rich alluvial loam, in sheltered position, free from frost, near the coast. The soil must contain a large amount of humus. The humus content of the soil must be kept up by mulching with green-manure crop, leaf mould, stable manure, &c.; and any acidity in the soil must be overcome by liming with lime, in form of carbonate of lime, as limestone, shell sand, limestone screenings, &c.

Even on exhausted soil, as long as the soil is in good physical condition and contains humus, bananas may be successfully grown by the aid of artificial fertilisers, applying from 5 lb. to 7 lb. of complete mixed fertiliser to each stool twice a year.

The following manure mixtures will be found beneficial, and will pay the grower by better returns of large bunches:—

Superphosphate, 3 to 4 cwt. Sulphate of potash, 2 to 3 cwt. Nitrate of lime or nitrate of soda, 2 to 3 cwt.	per acre;

higher or lower amount according to age and quality of soil;

or,

Superphosphate, 1½ cwt. Bonemeal, 1½ cwt. Sulphate of potash, 2 cwt. Nitrolim or nitrate of soda, 2 cwt.	per acre;

or,

Superphosphate, 3 cwt. Sulphate of potash, 2 cwt. Dried blood, 2 cwt.	per acre.

The artificial manure to be applied in two dressings—one towards the end of summer, at the end of rainy season; and the other at the end of winter. Some soils contain a very small amount of salt, and in that case bananas will benefit by a slight dressing of common salt, at the rate of 1 to 2 cwt. per acre.

CHERRIES.

The successful growth of this fruit is confined to a few localities in this State, as it requires a well-defined cold winter and rather rich, deep, well-drained loam. In suitable localities the use of artificial fertilisers is particularly profitable for this crop, and in accordance with the size of the tree and expected crop the following quantities should be applied per tree:—

2 to 4 lb. of superphosphate;
1 to 2 lb. of sulphate of potash;
1 to 1½ lb. of nitrolim, or sulphate of ammonia;

or,

1 lb. of superphosphate;
2 to 4 lb. bonemeal;
1 to 2 lb. of sulphate of potash;
1 to 2 lb. dried blood;

or,

from 5 to 10 lb. of a mixed fertiliser containing from 6 to 12 per cent. soluble phosphoric acid, 3½ to 4 per cent. of nitrogen, and 5 to 6 per cent. of potash.

CUSTARD APPLE (Cherimoyer).

This tree is easily grown on most parts of coastal Queensland, or any fair class of soil. Apply, in accordance with the age of the tree:—

1 to 3 lb. superphosphate 2 to 6 lb. meatworks manure (with blood) 1 to 2 lb. sulphate of potash	per tree.

GRAPES.

Grapes may be successfully grown over a great part of Queensland, extending from the coast to the interior. Any soil, from a light loam to a clayey soil, is suitable, as long as it contains plenty of sand and gravel, and is well drained.

Improved methods of cultivation and the use of artificial fertilisers increases yield and quality of the fruit considerably. Excellent results have been obtained in South Australia with a yearly application of—

1 cwt. superphosphate
¼ cwt. sulphate of potash
¼ cwt. sulphate of ammonia
} per acre;

or applying about 3 oz. of the mixture to each vine.

COWPEAS.

The great value of cowpeas as a green manure is well understood in Queensland; and the growing and ploughing-in of this legume are largely practised, especially in the sugar districts. A correspondent of the "Journal of the Jamaica Agricultural Society," understanding that allowing cowpeas to ripen and picking them does not interfere with the nutritive powers of the peas as a green dressing, asked if it would not be a benefit if the peas could be grown and used as food without detriment to the rest of the crops as a green dressing. Following is the reply by the Editor of the above journal—a reply which will be endorsed by all acquainted with this use of the cowpea:—

It surely is obvious that taking away the mature cowpeas, which are the quintessence of the plant, to the extent of 10 to 15 bushels per acre, weighing 60 lb. to the bushel, and which are rich in nitrogen, must take a large proportion of the nitrogen from the soil that the cowpeas were purposely grown to add. If, on the other hand, the cowpeas are cut down when in blossom, or just setting pods, just when the whole powers of the plant are concentrated on making seed, then all the nitrogen, which is the most valuable element, would be added to the soil. The cowpea, in common with other legumes, has the power of absorbing nitrogen from the air; it does not add potash or phosphoric acid to the soil. except that legumes are, as a rule, vigorous growers and deep-rooted, and may utilise stores of potash and phosphorus which more superficially rooted plants would not get at; and thus legumes make these plant foods available for crops, say bananas.

The planter must calculate whether adding so much nitrogen to the soil for the benefit of his bananas or selling his cowpeas will pay him best. He does get benefit in additional humus added to the soil from the dry vines and roots of the cowpeas, together with a modicum of additional nitrogen, no doubt; but all the cowpeas sold off the land

represent so much available fertility lost to his bananas or cocoa or other staple crop.

It has been estimated in the United States that one average acre of cowpeas contains 65 lb. of nitrogen, 111 lb. of potash, and 20 lb. of phosphoric acid; of this the roots and stubble contain 8 lb. of nitrogen, 18 lb. of potash, and 13 lb. of phosphoric acid. A fair crop of 12 bushels of dry peas weighs 720 lb., and of this 18 per cent., or 40 lb., is nitrogen. You get, therefore, 8 lb. of nitrogen in the roots and stubble left, and 17 lb. in vines; and you lose 40 lb. in the peas taken off. You also, however, lose potash and phosphoric acid taken off in the peas—viz., 93 lb. of potash and 7 lb. of phosphoric acid—according to these figures. Adding a fertiliser, especially made up for cowpeas, to the soil when planting the cowpeas would enable a crop of peas to be taken off and still benefit the bananas.

A fertiliser for cowpeas, as laid down in a treatise of the United States Department of Agirculture, should contain about the following proportions:—8 per cent. available phosphoric acid; 6 per cent. actual potash, applied at the rate of 400 to 500 lb. per acre. Nitrogen is not needed for this crop, unless the soil is so very poor that the peas start off with a very weakly and sickly looking growth. This condition would require about 75 lb. of nitrate of soda added to the soil per acre.

A USE FOR SEA ISLAND COTTON.

Sea Island cotton finds an important use in the manufacture of motor tyres. The "Times" contains a striking advertisement notifying the fact that the Goodrich Company, Limited, entirely uses Sea Island cotton as the fabric for the foundation of their tyres. It is stated:—

> "There is as much difference between the value of the best cotton and the worst as between cotton and silk. The very finest cotton is the true Sea Island variety. Its quality in length and fineness of staple is extraordinary."

The above advertisement is one of the first that has been noticed in regard to the virtues of Sea Island cotton. The best Sea Island in the world is produced in the Island of St. Vincent, in the West Indies.—"Journal of the Jamaica Agricultural Society."

[With reference to the virtues of Sea Island cotton, there is a cotton grown in North Queensland, evolved some years ago, by Dr. David Thomatis, called "Caravonica." Of this there are three grades —Caravonica Silk, Caravonica Wool, and Kidney-seed Caravonica. The first of these more than possessed the qualities ascribed to Sea Island (of which it is a hybrid), and brought in the European markets a higher price than the latter.—Ed. "Queensland Agricultural Journal."]

HOW CAN CROPS BE GROWN WITHOUT POTASH MANURE?

The "Journal of the Board of Agriculture" (London) for August, 1915, contains a long and very interesting and instructive article dealing with the above subject, with a view to finding out the best courses to be adopted in the circumstances. It is incidentally mentioned that potash manures are only of recent use in the United Kingdom, and they were not imported in any quantity until about 1890. All the good farming of the sixties was done without them. The crops which most urgently need potash are potatoes, mangolds, and the leguminous crops (clovers, lucerne, vetches, peas, beans, &c.) How, then, is it possible to arrange a supply of potash for them?

Two methods may be adopted:—

(1) Other sources of potash can be used instead of the ordinary Stassfurt salts; and

(2) The supplies of potash in the soil can be made available.

SOURCES OF POTASH OTHER THAN STASSFURT SALTS.

(*a*) VARIOUS ASHES, ETC.—Attempts to utilise various potash minerals which occur in quantity in different parts of the world outside Germany have not materialised. Consequently, none of these can help. Since the war, however, attention has been directed to various sources of supply which are or could be brought immediately within the reach of farmers. These sources are included in Table 1:—

TABLE 1.—SOURCES OF POTASH OTHER THAN STASSFURT SALTS AVAILABLE ON THE FARM.

Material.	Percentage of Potash (as K_2O).*	Further information is given in:—
Ashes of seaweed	16	This Journal, Vol. 17, p. 464.
Ashes of bracken	2·5	This Journal, Vol. 15, p. 481.
Ashes of hedge trimmings ..	10	This Journal, Vol. 21, p. 694.
Ashes of waste cavings and waste from threshing	8 to 10	This Journal, Vol. 21, p. 694.
Ashes of wood waste, sawdust, &c.	5 to 7	Gimingham, Long Ashton, Rpt., 1914.
Fluedust from sawmills	up to 10	Gimingham, Long Ashton, Rpt., 1914.

* Kainit contains 12 per cent. of potash as K_2O.

In all these cases except the last the potash is present as carbonate—a very soluble and highly available fertiliser. Its drawback is that it is rather too soluble, so that the ashes have to be kept dry and, above all, carefully shielded from rain, or they may lose half their value in a single night. They can safely be mixed with superphosphate before distribution, and applied at the rate of about 3 cwt. per acre.

Attention having recently been directed in this Journal to most of these substances, it is unnecessary to do more than emphasise once again the urgent necessity of preserving them carefully, and, when practicable, of increasing the supplies by collecting hedge trimmings, prunings, dead bracken, and other waste vegetation for burning and conversion into ash.

Seaweed contains so much potash, and such good fertilising material generally, that we may yet hope to utilise it better than at present.

(*b*) FARM PRODUCTS.—Farm crops contain considerable proportions of potash, as shown in Table 2. Mangolds easily head the list, a 40-ton crop containing in the roots alone no less than 400 lb. of pure potash, equivalent to 30 cwt. of kainit, while the leaves contain an additional 150 lb. of potash, equivalent to 11 cwt. of kainit. It is evident that the leaves represent a useful source of potash, and should not be wasted; they should be spread evenly on the soil and ploughed-in; decomposition rapidly begins, and the potash is set free. They are relatively free from insect and fungoid pests, and there is little (if any) risk of introducing harmful organisms into the soil to injure the next crop:—

TABLE 2.—APPROXIMATE POTASH CONTENT OF VARIOUS FARM PRODUCTS.

Crop or Produce.	Size of Crop per Acre.	Weight of Potash (K_2O) Removed per Acre.	Proportion of Potash in the Crop.	Weight of Potash in 1 Ton of Crop.	Approximate Weight necessary to furnish as much Potash as 4 cwt. of Kainit.
		Lb.	Per Cent.	Lb.	Tons.
Mangolds, roots	40 tons	400	0·45	10	5½
Mangolds, leaves ..	15 tons	150	0·45	10	5½
Turnips, roots	20 tons	110	0·25	5½	10
Potatoes, tubers ..	8 tons	108	0·6	13½	4
Clover hay	2 tons	68	1·5	34	1½
Hay from well-manured land*	2¼ tons	101	2·0	45	1¼
Hay from unmanured land†	1 ton	28	1·25	28	2
Ordinary meadow hay	1½ tons	54	1·6	36	1½
Oats, grain	60 bushels (2,400 lb.)	12	0·5	11	5
Oats, straw	32 cwt.	36	1·0	22	2½
Wheat, grain	40 bushels (2,480 lb.)	12	0·5	11	5
Wheat, straw	36 cwt.	32	0·8	18	3

* Rothamsted Park hay, Plot 16 (mixed mineral manure and nitrate of soda.)

† Rothamsted Park hay, unmanured. Analytical data given in Phil. Trans., 1900, Vol. 192, p. 199.

The potash in these crops is drawn partly from the original stock in the soil, and partly from purchased manures and feeding stuffs. If the crops are sold off the land, the potash is entirely lost to the farm, but more usually the mangolds, turnips, and part of the hay and straw are consumed on the farm. It is interesting to notice that these—the hay and root crops—contain by far the greatest proportion of potash. With the striking exception of potatoes, the crops sold off do not remove much potash, grain in particular taking away relatively very little.

Where the crops are consumed on the farm, a certain proportion of the potash finds its way into the manure, and so back to the land. It

thus keeps circulating between the soil, the crop, the animal, and the manure heap; and we must now inquire what losses arise during the process, and how they may be stopped.

Potash Retained by Live Stock.—Potash is less retained by live stock than any other ingredient of manurial value in their food. Lawes and Gilbert, during their famous experiments of 1849-50, found that the increase of weight during fattening was found to contain 1·27 per cent. of nitrogen, 0·86 per cent. of phosphoric acid, but only 0·11 per cent. of potash; in other words, for every hundredweight of flesh laid on, a fattening animal retains only 2 oz. of potash. Milch cows retain more. Milk contains about 0·17 per cent. of potash, so that 100 gallons contain, approximately, 1⅔ lb.

The Amount of Potash Passing into the Manure.—About 90 per cent. of the potash present in the animal's food is assimilated and passes into the animal's circulation. The animal does not keep it. What then happens to it? The answer is, that it is excreted in the urine, in which form it is a highly available fertiliser. . . . . The high content of potash is characteristic of urine, and is one of the reasons why especial care should be taken to save it at the present time.

There are three ways in which this can be done:—

(1) By using litter enough to soak it up;

(2) By protecting the manure heap against loss; and

(3) By adopting suitable means for collecting it.

Losses from the Manure Heap.—Farmyard manure contains its potash in two forms: the soluble compounds coming from the urine, and the insoluble compounds present in the litter. The sum of the two amounts to about 15 lb. of potash per ton of manure, or rather more than the quantity found in 1 cwt. of kainit or ¼ cwt. of sulphate of potash. The soluble part is liable to considerable loss by washing and drainage unless the heap is adequately protected from heavy rainfall.

At Rothamsted the following losses were found to occur:—

—	Heap Sheltered from Rain; Drainage at a Minimum.	Heap Exposed to Rain; Considerable Drainage.
	Lb	Lb.
Potash originally present in heap	147	175
Potash left after three months' storage	130	123
Potash lost	17	52
	Per cent.	Per cent.
Potash lost, of total	12	30

The liquid draining away from the heap contains the potash; if it is carefully kept the loss is less serious. Hendrik has recently shown that on an average it contains 0·46 per cent. of potash, or 300 gallons contain about as much as is present in 1 cwt. of kainit, and in an admirable state of availability. Good results were obtained by applying it to grass land.

It appears, then, that the waste of potash on the farm need not be great. The chief points of leakage are the cattle yard and the manure heap, and the chief way in which loss arises is through wastage of the urine and of the brown liquid draining away from the manure. If these sources of loss are stopped, the circulation of potash between the soil, the crop, and the manure heap can be kept up without much loss.

It is now clear why potash did not enter more largely into the scheme of manuring on British farms prior to the more extended cultivation of the potato. A farm worked on the old four-course rotation, and selling only grain and meat, can be made largely self-supporting in the matter of potash supplies if the manure heap is properly managed and the liquid manure is preserved. The bulk of the potash taken up by the cereal crop remains in the straw, and does not pass into the grain: thus, so long as the straw is kept on the farm the supply is only slowly exhausted. Fattening and milking cattle only retain a small part of the potash supplied in the food, even a milch cow only passing some 10 per cent. into its milk; all the remainder goes out in the excretions.

Methods of Rendering the Potash Reserves in the Soil Available.—Although potassium fertilisers are easily soluble in water, they do not readily wash out from the soil, because they become absorbed or fixed by some of the soil constituents. Wherever high farming has been practised, and large quantities of potash salts, stable manure, or feeding stuffs have been imported on to the farm, the amount of potash supplies may well have been greater than the amount removed by the crop. A certain accumulation has, therefore, taken place in the soil, forming a reserve which can be drawn upon in the present emergency. The process is essentially one of liquidating capital, and if persisted in for many seasons might have bad effects, but as a war measure no harm need be anticipated.

Two general methods may be adopted:—

(1) Dressings of sodium salts may be applied, such as agricultural salt or sulphate of soda; or

(2) The land may be limed.

Both processes liberate some of the locked-up potash, but they show certain differences that require discussion.

The use of salt or sulphate of soda as a liberator of potash has long been recognised by agricultural chemists. At Rothamsted sodium salts are successfully used on wheat and on mangolds, and analysis shows that they increase the availability of soil potash to the plant:—

TABLE 5.—EFFECT OF SODA IN CAUSING THE LIBERATION OF POTASH FROM THE SOIL (ROTHAMSTED).

Manurial Treatment.	Wheat, Broadbalk Field, 1852-1871.			Mangolds, Barnfield, 11 Years, 1903-1914.*
	Yield of Grain per Acre.	Yield of Straw per Acre.	Total Potash taken by Crop in the 20 Years per Acre.	Yield per Acre.
	Bushel.	Cwt.	Lb.	Tons.
Ammonium Salts only ..	26	23	540	6·9
Ammonium Salts + Super.	28	26	569	7·1
Ammonium Salts + Super. + Sulphate of Soda	34	32	832	23·8
Ammonium Salts + Super. + Sulphate of Potash	34	34	1,084	23·0

* 1908 omitted, as swedes were grown instead of mangolds. Rape cake formed part of the dressing in each case.

We have not space to give the entire text of this most valuable article, but have selected the most salient points which seem to us to be of interest to Queensland agriculturists. The article concludes thus:—

"The continued lack of potash may be met in two ways:—

(1) Greater care must be taken of the sources of potash already available on the farm: wood ashes, damaged straw, mangold and other leaves, liquid manure, &c., which are often allowed to waste in normal times. These contain considerable quantities of potash which, in the aggregate, would help materially in coping with the present shortage. Moreover, the ploughing up of leys and grass land leads to the liberation of the potash stored up in the roots, stems, and leaves, causing it to become available for the next crop.

(2) On most well-managed farms there are supplies of potash in the soil which can now be made available. Two agencies may be adopted:—(*a*) Sodium salts, especially salt and sodium sulphate; and (*b*) lime or chalk. The former can be used for mangolds and for cereals when necessary; lime and chalk are more suitable for leguminous crops (clover, &c.) There might be some risk in using either for potatoes, and growers would probably do best to put all their supplies of potassium salts on this crop.

"Neither lime nor salt actually *supplies* potash, and the method only works where potash is already stored up in sufficient quantity in the soil. On meadow land poor in potash it may prove better to apply liquid manure, as is often done successfully in the north."

COTTON-GROWING IN AMERICA AND QUEENSLAND.

There is a very erroneous impression amongst some Queensland farmers that cotton is still grown in the United States by black labour. This is not the case. Cotton is grown there, as here in Queensland, by white labour, and farm hands in the States of America are quite as alive

to the "living wage" as are those of this State. It has long ago been shown that cotton can be grown in Queensland to perfection, not only on the coast lands, from South to North, but also in the inland districts far distant from the coast. In times past cotton was grown here on a large scale, and there are to-day, since the failure, owing to the drought of the last few months, of the wheat crop, indications that the drought-resisting cotton will be largely planted during the coming season. In the old days of cotton-growing no account was taken of the seed. This was left to rot in heaps wherever cotton gins were at work. Its value was not realised by either the grower or the ginning owners. By-products, such as linters, hulls, oil, cake, &c., were never taken into consideration.

Now, take the American cotton-seed industry. In twenty-five years the value of cotton-seed in the States has risen from £4,000,000 to £27,000,000, and to-day the cotton fields of the United States have, to a large extent, replaced in their economic system the olive groves of the Mediterranean olive districts. Cotton-seed oil is a good edible product, and cotton-seed oil cake is a valuable cattle food.

MARKET GARDENING.

THE PUMPKIN BEETLE.

This pest attacks pumpkins, marrows, melons, and cucumbers, settling and feeding on the leaves in great numbers. They may be to a large extent destroyed by hand-picking in the early morning. When quite young the plants may be protected by a covering of hessian, but as they rapidly grow and send forth runners, something else must be resorted to to keep down their numbers. It has been noticed that, although endowed with a ferocious appetite, the beetle (Banded Galerca) declines to consume foliage which has become soiled. Accordingly the plants may be more or less protected by dusting upon them fine wood ashes and air-slaked lime, with a little kerosene or carbolic acid sprinkled on. For poisoning, treat the plants with Paris green applied in the form of a fine spray, not exceeding 1 lb. to 160 gallons of water. This must be kept well stirred when in use, and should not be applied during rain, sunshine, or heavy drying winds, nor within a month of the time of gathering. Another good spray is made of white arsenic, 1 lb.; unslacked lime, 2 lb.; water, 3 gallons. Slowly slack the lime, add the arsenic, put in the water, and boil for an hour. Add 160 gallons of water, and it is ready for use. Where practicable, as in a small market garden, shake the beetles into a bucket containing a little kerosene or boiling water. Where they are feeding in great numbers, this would be a simple way of destroying considerable numbers, and be taking advantage of the habit this species has of feeding in company, and suddenly dropping off the leaves when alarmed.

Pastoral.

SHEEP ON THE DAWSON VALLEY COUNTRY.

Mr. W. G. Brown, Instructor in the Sheep and Wool Industry, Department of Agriculture and Stock, replying to a series of questions by an intending sheep-farmer at Deeford, says:—

I have no doubt whatever that sheep would do well on your country, especially the crossbred (say, Border-Leicester on Merino). I will answer your questions seriatim.

(1) Merino sheep on cultivation or artificial grasses will do well, but crossbreds will do very much better, as they are hardier in every way, and can stand up better against internal parasites than Merinos.

(2) The only diseases to fight in that district are parasitic, (*a*) stomach worms (*Strongylus contortus*), (*b*) nodule worms (*Oesophagastoma Columbianum*), (*c*) blow-fly pest. The cure is simple, and instruction will be given by an officer of this Department should it be desired.

(3) Rhodes grass is eminently suitable for sheep, and this matter, from information at my disposal, has gone past the experimental stage. Sheep, however, prefer a short bite, hence it is better that the Rhodes should not be too rank or coarse.

(4 and 5) Border-Leicester or Romney-Marsh on good plain-bodied Merino ewes. Good crossbred ewes are very scarce and expensive, but a Lincoln-Merino is an ideal first cross.

(6) The silage mentioned (a mixture of Rhodes grass, millet, maize, sorghum, and peas) forms a very high-class fodder, and sheep will eat it readily. A ewe suckling a lamb will keep in good condition on 4 lb. a day. If there is other rough feed, 2 lb. would suffice.

(7) I do not consider Prairie a high-class sheep feed. It cannot stand a dry spell as can Rhodes.

(8) A good stand of Rhodes grass will keep sheep in good condition at the rate of, at least, six sheep per acre.

ERADICATION OF THISTLES.

Although no efficacious remedy for exterminating Scotch Thistles is known, it may be of interest to note that in some parts of Queensland, where the pest has appeared, it practically was choked out by reason of the fact that when the weeds were in such excess quantities the immediately available supplies of moisture and plant-food were exhausted. The land also became " thistle-sick " from the exudation of toxins from the roots. In ordinary seasons the Rhodes Grass is able to exercise its well-known smothering tendencies, but where the thistles are well advanced, any other quick-growing grass, or seeds sown for a particular purpose and to get a " burn," would be equally impracticable.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF SEPTEMBER, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Gretchen ...	Holstein	16 Aug., 1915	1,179	3·4	46·85	
Davidina ...	Ayrshire	21 Aug. ,,	819	3·9	37·47	
Sylvia II. ...	Shorthorn... ...	25 Aug. ,,	869	3·6	36·61	
Lennie ...	Ayrshire	23 July ,,	823	3·7	35·85	
Bluebelle ...	Jersey	20 June ,,	653	4·2	32·22	
Lilis ...	Ayrshire	19 Aug. ,,	734	3·6	30·96	
Noble Dot ...	Jersey	2 May ,,	499	5·1	30·06	
Iron Plate ...	,, ...	21 Feb. ,,	509	5·0	30·04	
Lady Dorset	Ayrshire	10 Aug. ,,	600	4·0	28·17	
Silver Nell...	Shorthorn ...	13 Aug. ,,	669	3·4	26·58	
Miss Bell ...	Jersey	2 July ,,	518	4·2	25·58	
Lady Twylish	,, ...	5 June ,,	475	4·5	25·17	
Rosine ...	Ayrshire	7 Aug. ,,	607	3·4	24·21	
Lady May ...	,, ...	7 Mar. ,,	499	4·0	23·45	
Miss Lark ...	,, ...	8 Sept. ,,	587	3·3	22·62	
Netherton Belle	,, ...	23 April ,,	449	4·2	22·15	
Lady Athol	Shorthorn... ...	29 May ,,	529	3·5	21·66	
Lady Melba	Holstein	6 Mar., 1914	437	4·1	21·05	
Auntie's Lass	Ayrshire	16 Feb., 1915	397	4·5	21·04	
Lady's Maid	Shorthorn ...	2 Feb. ,,	349	5·0	20·60	
Princess Kate	Ayrshire	9 July ,,	440	3·9	20·13	

Fed on natural pastures, supplemented by daily ration of 35 lb. of panicum ensilage per head.

COMMENT UPON HERD-TESTING OPERATIONS.

BY E. GRAHAM, Dairy Expert.

During the year, herd-testing operations were conducted by the Herd-testing Officer (Mr. L. Andersen) in numerous districts throughout the State, and the particular localities comprised were:—Wellcamp, Cambooya, Greenmount, Swan Creek, Jondowae, North Arm, Yandina, Eumundi, Kenilworth, Goomboorian, Goondoon, Mount Larcomb, Gogango, Bushley, The Caves, Woowoonga, Byrnestown, Coulstoun Lakes, Goomeri, and Atherton Tableland.

It will be noticed that the activities of the Herd Tester extended over a considerable portion of the area utilised for dairying purposes, but there remain some important dairying centres which hold aloof from the adoption of systematic herd-testing. The principal inquiry for the services of the Herd Tester came from those who have recently entered into dairying as a means of livelihood; and the desire manifested by the later converts to dairying towards effecting an improvement in the quantity and quality of the milk yields of their dairy herds augurs well for the future of the industry, and shows plainly that in this particular at least numbers of the younger generation are fully appre-

hensive of the necessity to engage in their herds only animals capable of yielding milk in profitable quantities.

Under existing circumstances, with specially high prices offering for either fat or store conditioned stock, the "lodger" cow is not to be tolerated within the dairy herds; and the result of herd-testing positively indicates that every herd contains animals which do not produce butter fat in sufficient quantity to reimburse the owner for the cost of their agistment and the expense involved in the drawing of the milk.

In order to meet the full force of the opposition levelled at the industry in this State by competitors within other countries actively engaged in the production of dairy products, it is essential that no delay should occur in the eradication of all low-yielding and unprofitable milch cows from the herds. At the present time we find returns showing that in several rival countries the number of pounds of commercial butter produced on the average by the milch cows utilised exceeds the average number of gallons of milk yielded by the dairy cows of this State.

Estimating that it ordinarily requires at least 2¼ gallons of herd milk to produce 1 lb. of commercial butter, it is not a difficult matter to form an opinion as to which set of competitors is to hold supremacy until such time as the disparity in the productiveness of the respective herds is reduced considerably. The actual testing of a few herds in each district, although beneficial, will not lead to a rapid increase in the general standard of productiveness of the whole of the dairy herds of this State. The number of cows utilised for dairying purposes is far too great to be appreciably affected by the results of herd-testing operations conducted upon a limited scale. Queensland is credited with containing more than 380,000 dairy cows, and during the last year the animals submitted to the Herd Tester did not total 5,000 in number. The cows tested represented less than 2 per cent. of the animals employed for the purpose of dairying. Surely it is high time the owners of the remaining 98 per cent. of milch cows set out to determine the actual profit-earning capability of the individual cows within their herds.

In order to encourage a general submission of the dairy herds to systematic butter-fat testings, the Department of Agriculture long ago provided the machinery necessary for the performance of the work involved in the actual testing of the milk. Consequently the dairy farmers are solely responsible for the restriction in the number of cows tendered for testing purposes, as they are, as owners, privileged to either submit or withhold their herds from the application of the test. However, the existing mark-time attitude and apathy shown to herd-testing should be promptly abandoned by dairy farmers and favour shown to a policy more in keeping with modern teachings. No material progress is possible, or is a full measure of the benefits of herd-testing to be enjoyed, until the dairy herds are subjected to the scrutiny of the Herd Tester in numbers more in keeping with the full complement of the cows utilised for the purpose of dairying.

It must ever remain that a highly productive dairy herd is the king-pin of success in dairy farming.

Appended is a summary of the herd-testing operations for the year:—

Number of cows submitted for the purpose of testing .. 4,310

Daily average yield of milk per cow in the tested herds:—

Mean	14·3 lb.
Highest	25·7 lb.
Lowest	1·8 lb.

Daily average butter fat content of herd milk:—

Mean	4·1 per cent.
Highest	5·9 per cent.
Lowest	3·0 per cent.

Daily amount of commercial butter produced per cow:—

Mean	0·68 lb. commercial butter.
Highest	1·23 lb. commercial butter.
Lowest	0·11 lb. commercial butter.

The result of an analysis of the behaviour of the individual cows comprised within the dairy herds, when submitted to a Babcock test by the Herd Tester, indicates that it is unnecessary to cite hypothetical cases for the purpose of illustrating the great variance existing in the relative quantities of butter fat produced by individual animals, and the influence this factor is capable of exerting over the amount of profit to be won from the dairy farm. The specific test results of several dairy herds, herein quoted, provide convincing evidence in this direction.

As an example, we shall first take Dairy Herd K. This herd comprised 15 cows.

A summary of the record made by these animals, when subjected to a butter-fat test, carried out under identical conditions, as far as treatment, access to pasture, &c., are concerned, is as follows: —

Animal A, 27 days in milk, produced 1·52 lb. of commercial butter in 24 hours.

Animal B, 28 days in milk, produced ·60 lb. of commercial butter in 24 hours.

At the above rate of production Animal A, in a lactation period of 300 days, would produce equivalent to 456 lb. of commercial butter; while A's companion B, in the same time, would produce equivalent to 180 lb. of commercial butter, leaving a difference of 276 lb. of commercial butter in favour of A.

Within the same period (300 days), the five foremost cows of this herd, collectively, produced—

1,410 lb. of commercial butter.

The five cows next in merit as producers of butter fat yielded, collectively—

1,100 lb. of commercial butter.

The five cows within the herd yielding least butter fat were capable only of producing, collectively—

885 lb. of commercial butter.

Taking the value of commercial butter at 1s. per lb., we find that the commercial butter production of the respective groups of cows has the following values:

	£	s.	d.
5 foremost cows within the herd yield 1,410 lb. of commercial butter at 1s. per lb, equal to	70	10	0
5 cows next in merit yield 1,100 lb. of commercial butter at 1s. per lb., equal to	55	0	0
5 cows (lowest producers) yield 885 lb. of commercial butter at 1s. per lb., equal to	44	5	0

15 being the total number of cows contained in the herd.

For the purpose of estimating the net profit accruing from the several group associations made of the milch cows contained in this particular herd, let us assume that the entire cost of maintaining or attending a dairy cow is £6 per annum. We then get the following figures:—

	Sales of Com. Butter. £	s.	d.		Cost of Maintenance. £	s.	d.		Net Profits £	s.	d.
5 foremost cows—gross receipts	70	10	0	less	30	0	0	..	40	10	0
5 cows next in merit—gross receipts	55	0	0	less	30	0	0	..	25	0	0
5 cows (lowest producers)—gross receipts	44	5	0	less	30	0	0	..	14	5	0

In reviewing the relative amounts of net profits, it is found that the five foremost cows are almost threefold as profitable as the five lowest producers in the herd.

Another point to be emphasised, and one which is frequently overlooked by those actively engaged in dairying, is that it is not necessary for an animal to produce three times as much butter fat as another in order to establish a threefold supremacy in profit earning. A comparison between the quantities of commercial butter above shown clearly indicates this, as, in volume, the amounts of commercial butter stand in the proportion of 1,410 to 885 or as 1·6 is to 1.

Example No. 2.

Actual test results connected with the testing of two cows comprised in Herd L are employed for the purpose of demonstrating the influence the percentage of butter fat in milk is capable of exercising over the quantity of commercial butter derivable from milk.

A comparison is made between the production of commercial butter by a cow giving milk of moderately high test with that of an animal yielding milk of a low percentage of fat; the milk yield in each case being very similar in quantity. The particulars are as follow:—

Both cows were 30 days in milk when testing operations were commenced.

Cow F yields an average of 23 lb. of milk, testing 2·6 per cent. of butter fat per day.

Cow G yields an average of 26 lb. of milk, testing 4·1 per cent. of butter fat per day.

In a lactation of 300 days the Cow G yields only 90 gallons of milk more than the Animal F; but the quantity of commercial butter produced by the former is 168 lb. in excess of that produced by the low testing Cow F.

Example No. 3.

In this instance the adoption of systematic herd-testing revealed the wide disparity which occurs in the relative productiveness of individual cows contained within the dairy herd. Such cases are not by any means unique, but are to be met with in almost every herd which has not been submitted to the scrutiny of a test.

The actual test records of two cows both fresh at their work, as quoted, are the results of testing operations conducted in Herd M:—

Cow H yielded daily average of 12 lb. of milk, testing 3·1 per cent. of butter fat for a period of 300 days.

Cow J yielded daily average of 28¾ lb. of milk, testing 4·1 per cent. of butter fat for a period of 300 days.

In the period taken—

Cow H produced 129 lb. of commercial butter, which, at 1s. per lb., equals £6 9s.;

Cow J produced 411 lb. of commercial butter, which, at 1s. per lb., equals £20 11s.;

leaving a difference of £14 2s. per annum in the gross earnings of the respective animals.

Assuming that the assessment of cost of maintaining and attending a milch cow is rightly estimated at £6 per year, it is evident that the Cow H is not a profitable animal to retain in the dairy herd.

In actual practice herd-testing has been the means of bringing to light innumerable animals incapable of producing butter fat in sufficient quantity to repay the owner for the cost of sustenance and attention involved in their maintenance; and the removal of animals found unprofitable for dairy purposes has been necessary in almost every herd tested. In some instances the percentage of animals necessarily to be culled from the herds has been comparatively small, being as low as 3 per cent. of the entire herd; but in other cases the eradication of as high as 56 per cent. of the cows has been necessary, in order to place the dairy herd upon a remunerative footing in so far as production of butter fat is concerned.

PRICKLY-PEAR AS A FODDER.

On this subject, Mr. R. O'Sullivan writes:—

"*Re* the above, I have pleasure in relating my experience, which, although only on a small scale, will prove that the prickly-pear is excellent for feeding cattle, and has the additional merit of being cheap. In the beginning of the big drought of 1902-3 I was living at Corinda, and a friend of mine, who is a surveyor in the Railway Department, suggested that we try prickly-pear for feeding our cows. I agreed, and

we got two of the local men to join in with us. We got a truckload of pear, as we wanted it, by rail from Nudgee, and divided it between us. To feed my cow, the course I adopted was as follows:—I put as much pear as I could cram into a kerosene tin, and then filled the tin with water. I then put the tin on the stove, and, after allowing the water to simmer for a couple of hours, I poured the liquid into another kerosene tin which contained about a quart of bran and one-third of the tin of lucerne chaff. Next morning I gave this to my cow, with the leaves, which were boiled; and although I experienced some trouble in inducing my cow to taste it, still, once she did so, she ate it afterwards most willingly. When I first started I used to cut off the big spikes, but I found that after being boiled they were quite soft. After that I boiled the spikes and all. I gave a similar feed every evening. My share of the pear lasted me over a month, and I am certain it did not cost me 10s. for the pear I used. I particularly noticed that, although I doubled the quantity of lucerne, when I ran out of the pear, if I had to wait a week or so for the fresh supply, my cow fell away in the milk, and came up again when I returned to the pear. A gentleman, whom I casually met in the train, informed me that he was feeding quite a number of cows on prickly-pear, boiled, but as he believed it would form a ball in the stomach he intended selling them when the drought was over. With regard to the 'ball in the stomach' theory, I am quite satisfied there is nothing in it, as I kept that cow for years afterwards, and I am certain it would have been hard to have found a healthier animal.

"I advised a well-known Sandgate milkman, who had the pear growing up against his fence, to try my method of using the pear, and he told me afterwards he found it good. I may say that this man thought he would improve on my way, and also save water by putting it through the chaffcutter, but he found his idea not feasible, as the pear, being greasy, clogged his machine. It often occurred to me, when I noticed the excessive—in fact, almost prohibitive—price of lucerne chaff, to publish in the Press my experience, but I refrained from doing so, as I dislike publicity; however, at a time like the present, I consider it is the duty of everyone to publish any information which may be useful."

SUDAN GRASS FOR PIGS.

Sudan grass has been most successfully grown at the Queensland Agricultural College. As a pasture grass it is highly recommended, especially as a pasture for pigs. It has been reported from the State of Kansas, U.S.A., that pigs were turned into a field partly sown with Sudan Grass and partly with Rape. It was naturally expected that the pigs would prefer the Rape, but, on the contrary, they left the Rape, and ate down the Sudan Grass, to the point of killing it out. This is good enough for Queensland farmers. Roots of Sudan or seed can be obtained from the Q.A. College; seeds at 4s. per lb., in small quantities, not exceeding 2 lb. to any one purchaser.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1915.

Seven thousand five hundred eggs were laid during the month—an average of over 141 per pen. C. E. Bertelsmeier's White Leghorns win the monthly prize with 161 eggs. The following are the individual records:—

Competitors.	Breed.	Sept.	Total.
Jas. McKay	White Leghorns ...	132	778
Mrs. J. Jobling, N.S.W.	Black Orpingtons ...	124	764
J. Gosley	White Leghorns ...	150	744
Mrs. Munro	Do.	146	740
C. E. Bertelsmeier, S.A....	Do.	161	736
J. D. Nicholson, N.S.W.	Do.	147	720
S. E. Sharpe	Do.	148	715
J. M. Manson	Black Orpingtons ...	150	715
A. W. Bailey	White Leghorns ...	145	712
Kelvin Poultry Farm	Do.	149	708
J. R. Wilson	Do.	135	700
E. F. Dennis	Do.	155	698
A. H. Padman, S.A.	Do.	154	696
King and Watson, N.S.W.	Do.	140	690
C. T. Clark	Do.	141	671
T. Fanning	Black Orpingtons ...	147	668
E. Le Breton	White Leghorns ...	142	667
J. M. Manson	Do.	153	663
A. T. Coomber	Do.	145	664
H. Hammill, N.S.W.	Do.	136	661
O.K. Poultry Yards	Do.	151	654
E. V. Bennett, S.A.	Do.	139	649
C. Knoblauch	Do.	148	647
E. A. Smith	Do.	150	647
R. Burns	Black Orpingtons ...	137	642
T. Fanning	White Leghorns ...	130	640
W. Purvis, S.A.	Do.	152	637
W. Parker...	Do.	151	633
W. Meneely	Black Orpingtons ...	131	633
G. Tomlinson	White Leghorns ...	140	632
F. Clayton, N.S.W.	Do.	140	628
R. Jobling, N.S.W.	Do.	130	626
Cowan Bros., N.S.W.	Do.	137	622
R. Burns	S. L. Wyandottes ...	138	617
R. Jobling, N.S.W.	Do.	121	616
Moritz Bros., S.A.	White Leghorns ...	142	614
Cowan Bros., N.S.W.	Black Orpingtons ...	134	611
Derrylin Poultry Farm	White Leghorns ...	133	607
W. Lindus, N.S.W.	Do.	147	604
W. Lyell	Do.	137	600
E. A. Smith	Black Orpingtons ...	152	585
G. H. Turner	White Leghorns ...	142	574
J. Zahl	Do. (No. 1)	145	572
J. Aitchison	Do.	127	569
J. G. Richter	Do.	144	563
J. Zahl	Do. (No. 2)	125	556
J. H. Gill, Victoria	Do.	155	549

Competitors.	Breed.	Sept.	Total.
Loloma Poultry Farm, N.S.W. ...	Rhode Island Reds ...	146	540
E. Pocock	White Leghorns ...	144	524
F. Clayton, N.S.W.	Rhode Island Reds ...	140	461
S. Chapman	Brown Leghorns ...	130	458
W. H. Forsyth, N.S.W.	White Leghorns ...	141	434
J. R. Johnstone	Plymouth Rocks ...	121	317
Totals	...	7,500	33,371

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER, 1915 AND 1914, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Sept.	No. of Years' Records.	Sept., 1915.	Sept., 1914.
North Coast.	In.		In.	In.
Atherton	0·46	13	Nil	2·15
Cairns	1·04	27	Nil	1·75
Cardwell	1·32	27	0·10	0·73
Cooktown	0·57	27	0·04	1·25
Herberton	0·44	27	0·04	1·50
Ingham	1·16	22	0·24	0·47
Innisfail	3·03	27	Nil	8·75
Mossman	0·79	5	Nil	1·85
Townsville	1·30	30	0·06	Nil
Central Coast.				
Ayr	1·90	27	0·48	0·04
Bowen	1·15	27	0·01	0·23
Charters Towers ...	0·84	27	0·47	0·18
Mackay	1·75	27	0·20	0·92
Proserpine	2·21	11	0·01	3·60
St. Lawrence ...	1·29	27	1·71	0·85
South Coast.				
Biggenden	1·48	14	2·65	0·73
Bundaberg	1·81	27	0·28	0·84
Brisbane	2·03	64	1·57	0·82
Childers	1·95	19	3·28	1·31
Crohamhurst ...	2·24	22	4·93	2·26
Esk	2·30	27	2·36	0·96
Gayndah	1·63	27	1·04	0·78
Gympie	2·22	27	3·18	1·46
Glasshouse M'tains	1·56	6	2·76	1·59
Kilkivan	1·77	27	0·79	Nil
Maryborough ...	1·78	27	2·94	2·35

Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Sept.	No. of Years' Records.	Sept., 1915.	Sept., 1914.
South Coast— continued:	In.		In.	In.
Nanango	1·96	27	2·43	0·15
Rockhampton ...	1·34	27	2·33	0·54
Woodford	2·14	27	2·71	0·82
Yandina	2·14	21	2.68	1·23
Darling Downs.				
Dalby	1·79	27	1·55	0·38
Emu Vale	1·86	17	0·67	0·45
Jimbour	1·75	24	1·20	Nil
Miles	1·43	27	0·93	0·50
Stanthorpe ...	2·23	27	1·81	1·04
Toowoomba ...	2·13	27	0·83	0·41
Warwick	1·98	27	0·61	0·34
Maranoa.				
Roma	1·49	25	0·67	0·31
State Farms, &c.				
Gatton College ...	1·66	14	1·12	0·48
Gindie	0·95	13	1·07	Nil
Kamerunga Nurs'y	1·13	23	Nil	3·44
Kairi	...	...	Nil	1·86
Sugar Experiment Station, Mackay	1·63	16	0·53	1·68
Bungeworgorai ...	0·77	3	0·91	0·58
Warren	0·14	3	0·08	Nil
Hermitage ...	1·56	7	0·73	0·33

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for September this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

State Farms.

STATE FARM, BUNGEWORGORAI.

The Manager furnishes the following report on the institution for the month of October:—

Meteorological.—Since submitting the previous report 61 points of rain have been recorded, but the benefit derived therefrom was of little consequence owing to the subsequent hot weather and strong drying winds. This month's record brings the rainfall for 1915 to a total of 504 points.

Winter cereals.—These crops are curing off, due to the fact that there is not sufficient moisture in the soil to meet the plant's requirements. Even with exceptionally favourable conditions prevailing from now on the yield will be extremely light and the grain of poor quality.

Harvesting operations should be commenced within the next fortnight.

Summer crops.—The crops mentioned as having been sown in last report germinated well, but are now in a precarious condition.

During the period under review another 10 acres have been sown with cow-peas and sorghums, bringing the total under summer crops to 29 acres.

Vineyard.—Splendid growth has been made in this section and the majority of the varieties give indications of heavy yields under congenial conditions.

Orchard.—Citrus: These trees are again exhibiting unmistakable signs of distress, and the prospects of this season's crop are anything but good. Deciduous: The apricots, so far as fruit is concerned, are a complete failure, but they are with one or two exceptions in a flourishing condition. The same remarks apply to the plums and other deciduous fruits.

Grasses.—Teff grass: The 7 acres sown with this grass is now tinged with green, a good germination having taken place. For this block alone it is hoped that rain will be experienced very shortly, so that the plants' behaviour on clayey and sandy soils under field conditions can be ascertained. Rhodes grass: This is again showing signs of the continued dry spell.

Miscellaneous sowings.—The crossbred cow-peas have been sown and a good germination was obtained, but owing to the depredations of the cut and wire worm, practically the whole of the plants have been destroyed.

Potatoes.—Three (3) drills of this tuber have been planted and are now above ground.

Cucurbitaceæ.—Small sowings have been made of water-melons, rock melons, and pumpkins.

Stock.—The horses look exceptionally well considering, and the cattle appear to be holding their own, with the exception of the cows, which have recently calved, these having fallen away a little.

The Orchard.

THE FIJI BANANA TRADE.

(From the "Fiji Planters' Journal.")

Our banana-growers have frequently been threatened with disaster in various forms. There have been floods and hurricanes, Queensland growers and Australian taxation—not to mention increased freights, Government inspection, and incomprehensibly small returns by account sales when the Australian market seemed otherwise normal.

Recently another shadow has risen upon the Fijian banana-planters' horizon which bids fair to develop serious proportions. We refer to the Tweed River banana trade. There is no doubt whatever that bananas of excellent flavour and sufficient size to hold their own against the Fiji-grown fruit are now being shipped by the Tweed River planters; and this fruit has the additional advantage of cheaper freight, no duty, and can reach the market 24 hours instead of 9 to 10 days after cutting.

With these facts before them, there is no doubt the Fiji banana-planters will see the necessity for looking to their laurels speedily, or they will be ousted from the field.

The age of competition has passed, and commercial concerns all the world over are succeeding or failing to succeed by their power of co-operation.

If the Fiji banana trade is to continue, there must be some co-operative effort on the part of our planters to handle their fruit to the best possible advantage, and stop all the present leakages by which thousands of pounds, which should go directly into the growers' pockets, are being diverted into other channels or absolutely lost.

Anyone who knows the Sydney banana market will admit that the best banana purchasable to-day is an inferior article compared to the best banana of ten years ago. This is, without doubt, due to the fact that in their effort to avoid loss by over-ripeness growers are cutting fruit in a less mature state than was the custom prior to inspection days.

This may be altered by having carrying facilities of a kind that can assure the delivery of the fruit in Sydney in exactly the same condition in which it is received by the carriers in Fiji. There is nothing Utopian about the suggestion. It is done all the world over, and argument as to possibility and advantage is superfluous.

Additional attention must be given to the packing of the best grade of fruits, in order that it may be delivered to the purchaser with the least possible handling. There is always a market for a limited supply of the finest fruit that can be grown at the very topnotch price. A price can be obtained in Australia for selected bunches of bananas carefully

packed in cases in Fiji, which will more than repay for the additional expense.

The present system of consigning to many small agents in Sydney, with absolutely no supreme supervision on the spot, is extremely foolish and alarmingly wasteful.

Bananas are piled out on the Sydney wharf with classification as to brand only, and there sold. . . .

Fruit graded according to quality, repacked for sale and country orders, and, where immature, placed in a warm room for ripening, would bring very considerably better returns than the same fruit sold in broken heaps even by auction.

Queensland fruit-growers now consign all their Sydney shipments to one man, who, while selling none himself, supplies the wholesale dealers with the quantities that in his opinion they can handle to advantage. In this way, if account sales on one shipment from a certain agent are without reason unsatisfactory, the Sydney manager is able to refuse to supply that agent with further fruit. The result is claimed to be most satisfactory to the Queensland growers.

An alternative scheme could be the opening up of a banana market in Sydney by the Fiji growers, where all fruit could be received, graded, repacked, &c., and sold by auction. Such market to be, of course, in the hands of a man whose continued employment depends upon his satisfactory returns, and who could be dismissed for failure to obtain the best possible results for his employers.

There may be other practical methods suggested; but, whatever scheme should be decided upon, to insure success it must be, as we have stated, a scheme of co-operative handling as against the present competitive sales.

BANANA MANURING.

By R. G. BARTLETT, H.T., State School, Buderim.

By experiments carried out in different places, it has been conclusively proved that potash is most essential to ensure successful results from the manuring of bananas. Owing to the war, potash cannot be obtained, as Germany was the sole source of supply. Growers are therefore in rather a quandary as to what is the best thing to do under the circumstances. Numerous inquiries on this subject have led the writer to give a short résumé of his investigations on this subject, with acknowledgments to J. C. Brünnich and Alfred E. Stephens.

The Influence of Lime.—The chief function of lime is a mechanical or physical one on the soil texture. Heavy clayey soils are rendered more friable and less tenacious, whilst, on the other hand, light, sandy soils are made more retentive by its use. It is the chemical action of lime,

however, which concerns us more closely at present. Lime counteracts any acidity and destroys the ill-effects of certain soluble iron salts.

It, again, *liberates valuable mineral plant foods*, chiefly *potash, existing in unavailable form*, and helps in the decomposition of organic (vegetable, &c.) matter.

Lime favours bacterial activity by counteracting the formation of excessive and undesirable acidity. Particularly does it assist the valuable bacteria of nitrification, which change ammonia salts into nitrates, and in making the nitrogen available to plant life. It is only by the action of the myriads of bacteria, with which every fertile soil teems, that the different plant foods in organic materials are made available to the crops.

Lime, as a direct plant food, is commonly present in most comparatively virgin soils in sufficient quantities. With constant cropping, cultivation, and the action of the continuous use of certain fertilisers, such as sulphate of ammonia, superphosphate, dried blood, &c., *the lime becomes gradually removed*, so that the soil, besides becoming possibly actually deficient in lime as a plant food, also acquires an acidity or sourness unfavourabe to successful plant growth.

It therefore follows that, where orchards have been previously manured heavily with potash and dried blood, sulphate of ammonia, or superphosphate, without periodical applications of lime, great results may be expected from applying heavy dressings of lime, followed two months later with applications of dried blood and superphosphate.

In order to demonstrate this, the bananas on the school plot were given a heavy dressing of lime—4 to 5 lb. per stool—at the end of July, while this month (October), 2 lb. of dried blood and 1½ lb. of superphosphate were applied to each stool.

Slaked lime (agricultural lime) is recommended in preference to limestone screenings which, though cheaper, are slower in action.

It must not be inferred that potash manures can be dispensed with altogether, but that, so long as sufficient potash is present in a soil, either naturally or as a result of previous heavy potash manuring, liming and manuring as above will help to temporarily dispense with the necessity to use further potash.

Remarkable improvement is noticed in the school vegetable plot from the use of lime this year. Hitherto only very average results have been obtained, even when manuring the vegetables with farmyard manure, with the addition of dried blood, superphosphate, and potash. So much has this been the case, that successful vegetable growing under ordinary conditions was almost despaired of. Lime has changed all that. Light dressings of lime before digging up the beds and the additio of small quantities of lime to the water-tank and the vegetables, now ar comparison with the best, even though artificial fertilisers have been dispensed with.

FRUIT-GROWING IN QUEENSLAND.

In the very early days of fruit-growing, with special reference to citrus fruits and pineapples, very good returns rewarded the growers, notwithstanding the want of experience in the business, and the absence of any expert assistance. This refers to the early sixties, when the only remedy for citrus pests was what was known as Gishurst's compound. But as time went on, the Agricultural Department, recognising the probable great future of this industry, stepped in to assist the fruit-growers by the appointment of instructors, whose life business it had been to study the causes of failures and the best means of combating the multifarious fungoid and insect pests which militated against success in the fruit-growing industry.

When Mr. A. H. Benson arrived in Queensland in 1896 and was appointed to the superintendence of this business, a radical change was effected. He brought to bear, on the citrus industry especially, his experience in America. He showed how fungoid and insect pests could be controlled by various means, and it was mainly owing to his work in Queensland, assisted by Messrs. Voller and Soutter, that to-day the fruit-growing industry from South to North is in a most thriving position.

Not to take a general view of the fruit-growing business in this State, we may cite, as one instance among many, the case of a fruit-grower (one of several) in the Blackall Range, who has so profited by the advice of the gentlemen named, and particularly by the advice of the Agricultural Chemist, Mr. J. C. Brünnich, who has done such splendid service to both citrus and banana growers throughout the State in advising as to the best manures to be applied to these crops.

In the instance above-mentioned, results of pineapple crops have been forwarded to Mr. Benson, and these have been verified.

The grower at Woodford planted 2 acres of rough pines three years and two months ago (December, 1911), and 1 acre of smooth pines one and a-half years ago, and the following is the account of pineapple sent to Brisbane by rail in 1915 (from this area of 3 acres) :—

PINEAPPLES SENT PER RAIL FROM WOODFORD, 1915.

—	CASES.	WEIGHT.			
		Tons	cwt.	qr.	lb.
Summer Crop, February to March	928	27	0	0	0
Winter Crop, June to 11th October	196	6	1	0	14
	1,124	33	1	0	14

In addition to the above, 15 cases were disposed of locally, and there were still a few cases to market.

The pineapples (2 acres) were planted between oranges and mandarins. Last summer, from 1 acre of "Smooths" (18 months planted), 225 cases of fruit were cut (case weight, net about 70 lb.). For the

winter crop, 182 cases were obtained, and still other fruits coming along. As shown by the above figures, up to the 30th September, 1915, the grower sent by rail this year 1,110 cases of pines, equal to 32½ tons from 3 acres, and still there would probably be 50 cases more to follow off the same area.

In addition to the freight (£11 17s. 10d.), freight was paid on a few cwt. of fertilisers.

These results are facts which can be verified by account sales, &c.

From our personal knowledge of the district, we can state that the soil, though of a deep, friable sandy nature, is by no means rich in plant food, but this only goes to strengthen the argument that by careful cultivation and judicious manuring, such results are almost certain to follow. As to the financial aspect, pineapple growers need not to be shown the profit on such transactions. They well know what expenses are incurred in manure, fruit cases, labour, &c.

DIRECTIONS FOR CANNING TOMATOES.

Select firm red tomatoes of uniform size; put into tray; and lower into boiling water for about 1 minute to make skins come off easily. Plunge into cold water to make fruit firm and peel promptly. Use a slender pointed knife to cut out the core, being careful not to cut into the seed cells.

All cans and utensils should be thoroughly sterilised by boiling for 20 minutes. Pack tomatoes in can as closely as possible to within ¼-inch of the top. Weigh cans; No. 2's should contain not less than 20 oz., and No. 3's not less than 33 oz., of tomatoes.

Mix sugar and salt in the proportion of one-third salt and two-thirds sugar. Put 2 level teaspoonfuls of this mixture in each No. 3 can of tomatoes, and 1 teaspoonful in each No. 2 can. Put the cap on the can, leaving the vent hole open; place cans in tray; and lower into boiling water, almost immersing, allowing cans to remain for 3 minutes to drive out the air. Tip the cans immediately after exhausting, and completely immerse in boiling water. No. 2 cans require 15 to 20 minutes' cooking; No. 3 require 22 to 30 minutes. Count from the time the water first boils, after immersing the cans, and keep it boiling constantly. Cool as quickly as possible.

If glass jars are used, put tops on loosely, set in water nearly to top and boil—pint jars 25 minutes, and quart jars 30 minutes. The top should be tightened as soon as the jars are removed from the water. Be careful in removing not to place jars in a draft.

In canning with a steam pressure canner, the cans are capped and tipped immediately after filling. Place in canner and process. No. 2 cans require 20 minutes at 228 degrees, 5 lb. pressure; No. 3 cans, 28 minutes at 232 to 235 degrees, 7 lb. pressure.—"Modern Farming."

Horticulture.

LIQUID MANURE.

Stable, cow, sheep manure, and poultry droppings can be used as liquid manure.

Many people have an aversion to using these because of the unpleasant odours.

For those who prefer the artificial manures we can recommend nitrate of soda, sulphate of ammonia, sulphate of potash, and Peruvian guano. The latter manure, when good, makes a first-class liquid manure, but we prefer the first three.

The ammonia and nitrate of soda produce luxuriant growth and must be used cautiously. A tablespoonful of either to two gallons of water makes a strong manure, and seldom requires to be used stronger. It is better to make the manure half the strength for most plants, otherwise there is a danger of killing the plants. We are now referring to ordinary garden plants.

Avoid wetting the leaves with the artificial manures. Some tender annuals can't stand such treatment.

If it is necessary to use sulphate of potash with either the ammonia or nitrate of soda, the amounts used must be lessened, say, half of each. Half a tablespoonful of each to about four gallons of water is quite safe.

Don't use these stimulants oftener than once a week. Once a fortnight is much safer.

Before applying the manure, wet the soil thoroughly, then apply the liquid manure some hours afterwards.

These tonics may be used on most of our spring flowers, roses, sweet peas, pansies, petunias, and most flowering plants in the conservatories.

If you want delicate and handsome blooms, use the liquid manures very sparingly.—"Garden and Field."

KEROSENE EMULSION.

Following is Professor Cook's formula for making kerosene emulsion, as given in his lecture before the Escondido Farmers' Institute:—" Dissolve from one-eighth to one-fourth pound soap in two quarts water. Remove from fire and add one pint of kerosene. Stir very vigorously, either by use of an egg-beater for small quantity or a force pump in case of a large amount. In the latter case use a small, single opening for nozzle, and pump the liquid back into itself. An emulsion will look like rich cream, and the kerosene will be permanently mixed. Now add seven pints of water, and it is ready for use. The application should be made with a force pump, and should be very thorough, as it must touch every insect.

Tropical Industries.

THE VALUE OF MANURE FOR SUGAR-CANE.

The "Journal of the Board of Agriculture" of British Guiana (Demerara) says that recent experiments conducted in various parts of Hawaii have shown that plant cane from an unmanured field will yield 25 to 30 tons of cane per acre, whilst by judicious manuring these figures reach as high as 40 to 42 tons per acre; and 4 to 6½ tons of sugar per acre were obtained from the completely manured plots against 3 to 4¼ tons where unmanured.

RUBBER IN MALAYA.

Notwithstanding the reduction in the price of plantation rubber of late, several plantations in Malaya and the Straits Settlements have returned handsome dividends to shareholders. Following is a statement published in "Grenier's Rubber News" of the results of the Bukit Rajah Rubber Company for the year ended 31st March, 1915, which must be highly gratifying to the shareholders:—

The company repeats its 1913-14 dividend of 50 per cent., writes off £5,000, by way of depreciation, against £3,000 the year before, and carries forward £8,003. The reserve account now stands at £21,000.

A statement is furnished of the crops of the various products and profits of the company for the last eleven years, and we quote the dividend distribution over this period:—

	Per cent.
1905-6	6
1906-7	30
1907-8	30
1908-9	55
1909-10	150
1910-11	150
1911-12	150
1912-13	125
1913-14	50
1914-15	50

The crop for last year came up to within 6,500 lb. of the estimate; and it is expected that a crop of 705,000 lb. will be harvested for the current year. The total area under rubber is 3,890 acres, of which 1,521 are not

in bearing, so that there is a splendid prospect before the company. It is not proposed to open any further clearings during the year. The average yield per acre last year was equivalent to 284 lb., as compared with 263 lb. in 1913-'14.

All-in cost has been brought down to 11·82d., and is made up as follows:—

	d.
F.O.B., Port Swettenham	8·39
Freight, insurance, and selling charges	1·59
Directors' remuneration, income tax, and London charges	1.84
Total	11·82

GINGER.

Ginger may be planted from August to November, or as late as December, putting the sets about one foot apart each way. The white varieties do better if planted twenty inches apart, and eight inches apart in the rows, the yellow requiring more space. When planting, the sets should be merely covered with soil, or, better still, with old cow manure. The shoots will come above ground in twelve or fourteen days. The only cultivation needed is to keep the surface soil loose and clear, but not more than an inch of soil should be stirred. During the process the plants are all the better for a few shovelfuls of rich, old compost added to the surface; the yield is in proportion to the richness of the soil. The roots are ripe in about seven months from the time of planting. The white sorts are the richest in flavour. The smaller, or narrow-leaved, variety is that used for the dry ginger of commerce. For this purpose the roots are allowed to lie in the ground until the leaf stalks have withered. They are then dug up and washed, the outside skin is scraped off, and the roots are dried in the sun.

PRESERVED GINGER.

To make preserves, the roots are dug as soon as they are fully grown and before the leaves begin to wither; they are then washed and scraped, cut into slices, and put into jars with salt and water for a few hours, or just sufficiently long to take away any earthy flavour. Then the slices are rinsed in clean water, and are put into a jar with a thin syrup made from white sugar. Change the syrup in three or four days, or as soon as it shows signs of fermenting. Reboil it, adding more sugar, and pour it upon the ginger again. This may have to be done three or four times, until the ginger has lost all its wild flavour, and is perfectly sweet and aromatic. It can then be covered up for future use.

80 LB. OF RUBBER PER TREE PER ANNUM.

The above is no doubt an extraordinary yield, and throws absolutely into the shade anything recorded before, but one must remember, however, that the tree referred to is now thirty-seven years old, having been planted at Heneratgoda Gardens, Ceylon, in 1877. The tree stands within a few feet of a hard cabook road, and its neighbours (two) are within fifteen feet of it. The most remarkable fact regarding this giant Hevea is the tapping of renewed bark, in one instance after three years, and in another section of the tree after only a year and ten months. We mention this specially, as the opinion is growing stronger daily that even six years is not too long to wait before tapping renewed bark. This heavy bearer cannot, however, be taken as a criterion for determining the time that should elapse before renewed bark is to be tapped. One great difference lies in the fact that this tree was not tapped systematically till it was thirty-two years of age, while plantation Heveas are taken in hand from their fifth year as a rule, perhaps earlier.

A recent issue of a bulletin issued by the Department of Agriculture, Ceylon, gives full particulars regarding the tapping which was begun on 5th December, 1908, and continued daily, on a full herring-bone system of three V's, extending over one-half the circumference, the cuts being one foot apart, and the lowest cut one foot from the ground. On 21st May, 1909, this herring bone (section 1) had been completely tapped, and on the following day a similar herring bone on the opposite side of the tree was begun (section 2). On 24th January, 1910, the second section was completed, and on 26th January a third section was begun, on the same pattern, above the first. The third section was completed at the end of July, 1910, and was followed by tapping on a fourth section, on the opposite side of the tree, *i.e.*, above section 2, on 1st August. This fourth section was completed on 17th January, 1911. Each of the four sections consisted of an area three feet high, extending half round the tree.

The yields from these four sections were as follows:—

Section.	Duration of Tapping.	Days Tapped.	Total Rubber. Lb.	Oz.
1	168	153	43	9
2	248	185	43	7
3	188	137	34	13
4	170	125	50	3

Thus for twenty-five months the yield was 172 lb. The out-turn for 1909 was approximately 76 lb., and for 1910, 89 lb. Both knife and pricker were used for tapping, and the tree showed perfect renewal after the first paring and pricking.

RENEWED BARK.

Tapping was commenced on 1st April, 1911, on the renewed bark of section 1, which was then two years four months old, *i.e.*, from the beginning of the first tapping. The tree was tapped by the same method

as before, but after the first six tappings the pricker was discarded, and the Bowan-Northway knife alone used. Tapping was carried on daily during alternate months until 30th April, 1912, by which time this section had been completely retapped. The following is the results of this tapping:—

Duration of Tapping Days.	Days Tapped.	Total Rubber. Lb.	Oz.
396	209	100	10

100 lb. in thirteen months is more than double the yield of the same area from original bark. Tapping alternate months, as also the disuse of the pricker, may have had some influence on the result, while climatic differences must also be reckoned with.

In May and June, 1912, the tree was again tapped on sections 2 and 4, *i.e.*, on the side opposite to that on which the tapping was first begun, the renewed bark on section 2 being then about three years old, and that of section 4 a year and ten months old, counting from the beginning of the original tapping. This tapping was continued daily for thirty-seven tappings only.

On 1st November, 1912, tapping was begun on the renewed bark of section 3, which was then about two years nine months old, reckoning, as before, from the beginning of the tapping on the original bark. This tapping was on the original system, and was continued daily, with a rest of six weeks, until 19th August, 1913.

The total yield from this upper section was 97 lb. 4 oz. in ten months, almost the same as that of the renewed bark on the lower section (section 1), on the other side, though the latter was tapped more slowly.

With short intervals this tree was tapped over a period of four years nine months, and yielded as follows:—

	lb.	oz.
From original bark	172	0
From renewed bark, section 1, completely tapped	100	10
From renewed bark, section 2 and 4, partly tapped	22	9
From renewed bark, section 3, completely tapped	97	4
Total	392	7

It would appear that at the end of 1908 the girth at six inches from the ground was 13 ft.; at three feet, 8 ft. 6 in.; and at six feet, 9 ft. 5 in. The main stem branches into two at about 10 ft. from the ground, and this fact accounts for the greater circumference at six feet than at three feet from the ground. Though it has been styled the Heneratgoda giant, it is not the largest tree in the group. In December, 1911, the tapped tree measured 115 in. at three feet, while the other tree measured 125 in. In August, 1914, the girth of the tapped tree at three feet was 117 in.—"Grenier's Rubber News."

[There is a very old tree standing near old Government House at Port Moresby, Papua, which yielded a fabulous quantity of rubber in a year, but the above undoubtedly beats all records.—Ed. "Q.A.J."]

Botany.

CONTRIBUTIONS TO THE FLORA OF QUEENSLAND.

By J. F. BAILEY and C. T. WHITE.

NEW SERIES—No. 1.

Order MENISPERMACEÆ.

STEPHANIA, Lour.

S. aculeata, *Bail.* To the description in "Queensland Flora," p. 33, add: Female flowers minute in axillary or terminal panicles. Carpels orange-coloured, compressed, 2 lines long; pericarp succulent; putamen hard, transversely tuberculate-costate.

Order CRUCIFERÆ.

CAMELINA, Crantz.

Erect more or less hispid annuals with sagittate or auricled stem-leaves, and small yellow flowers. Pod obovoid, the partition broad, the valves very convex, with the midrib distinct, the edges flattened, forming a narrow margin round the pod. Styles slender. Seeds several.

C. sativa, *Crantz.* (False Flax.) Stem simple, or slightly branched, 1-2 ft. high. Lowest leaves stalked, upper ones sessile, stem-clasping with rounded auricles, lanceolate, entire or toothed, 1-2 in. long. Flowers numerous. Pods about 3 lines long on pedicels about twice that length in a long loose raceme.

Hab.: A native of Southern Europe and temperate Russian Asia, widely spread as a weed of cultivation, especially in grain and flax fields, over the world; has lately established itself about Brisbane, coming up spontaneously with flax.

Order LEGUMINOSÆ.

CASSIA, Linn.

C. costata, *Bail. f. & White*, sp. nov. (Plate 22.) Shrub 6 ft. Glabrous. Stems costate with more or less prominent ribs. Leaflets 4-6 rather distant pairs, oblong-linear, ½ to 1½ in. long. Gland stipitate between the lowest 1 or 2 pair of pinnæ, but often wanting. Stipules small. Flowers in short umbel-like racemes in the upper axils. Peduncles about ¾ in. long. Bracts 1½ line long. Sepals unequal broadly ovate, 2-3 lines long. Petals unequal, 4-5 lines long. Stamens all perfect. Anthers equal, all on short filaments. Ovary sericeous. Pod glabrous, shortly stipitate, 3-4 in. long, curved sometimes into almost a circle. Seeds 15-20, black, shining, attached to a long funicle.

Hab.: Woolgar, *E. W. Bick*, August, 1915.

This new species belongs to Bentham's section *Psilorhegma*, and differs sufficiently in several details from all other species of that group to take specific rank. Its position in the Queensland species is between *C. glauca* and *C. retusa*.

PLATE 22.—CASSIA COSTATA, *Bail. f. and White, n. sp.*

Order FUNGI.

The following additions to our Fungi have been determined at the Royal Botanic Gardens, Kew, England.

Agaricus (Clitocybe) decastes, *Fries.* prox.

Hab.: In grass land Botanic Gardens, Brisbane.

Megalonectria nigrescens, *Kalch. et Cke.*

Hab.: On dead stems of *Ficus pumila,* Botanic Gardens, Brisbane.

Uredo pelargonii, *Thuem.*

Hab.: On Pelargonium leaves, Brisbane, *F. Burtt.*

Pestalozzia breviseta, *Sacc* (?).

Hab.: On leaves of *Kennedya rubicunda,* Kedron Brook, *C. T. W.*

Monilia carbonaria, *Cooke.*

Hab.: On dead prickly-pear, Dulacca. On burnt stems of bamboo, Brisbane Botanic Gardens.

In "Queensland Agricultural Journal," Vol. III., n.s. (1915), p. 170, this is recorded as **Rhinotrichum pulchrum,** *Berk.* In a note since received from Sir D. Prain he says the correct identification is as above.

Science.

ANALYSIS OF ASH OF CROW'S FOOT ELM.

By J. C. BRÜNNICH, Agricultural Chemist.

With the present scarcity of potassic fertilisers the farmer must be on the lookout for substitutes, and utilise sources hitherto neglected.

The Department of Agriculture and Stock has repeatedly asked for samples of any material which, may be, contain appreciable amounts of potash.

A fairly complete list of wood and plant ashes was published in the list of analyses of fertilisers which appeared in the August number of this journal.

Mr. A. E. Stephen, the delegate of the Chilean Nitrate Committee of Australasia, collected a sample of the ash of crow's foot elm in the Atherton district, and from the analysis below it will be seen that such ash would be a highly valuable fertiliser for crops like maize, potatoes, vegetables, &c., on account of the fairly high amounts of potash and phosphoric acid contained in this ash.

The ash contains, in per cent.—

Lime	46.91
Potash	5.75
Phosphoric acid	6.24

Entomology.

NOTES ON EXPERIMENTS FOR THE CONTROL OF THE SUGAR CANE BEETLE.

BY E. JARVIS, Entomologist, Bureau of Sugar Experiment Stations.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from Mr. E. Jarvis, Entomologist to the Bureau:—

Experimentation against the grub stage of *Lepidiota albohirta* was carried on for a time, but discontinued about the middle of August owing to the majority of the grubs having ceased feeding preparatory to pupation.

Arrangements are being made to conduct a few initial experiments in connection with oviposition, and to resume research work instituted last season relating to the control of the adult beetle.

The period which immediately follows the primary emergence, and lasts about a month, is naturally of great economic importance, embracing as it does both adult and egg stages, and thereby affording possibilities of getting at the root of the trouble by preventing deposition of the eggs, or destroying them in the soil.

It is hoped that these experiments will to some extent test the value of the following remedial methods applicable to the beetle and egg stages:—

(1) Trapping beetles by means of artificial light.
(2) Trapping beetles by means of attractive odours.
(3) Preventing the laying of eggs by poisoning the adult female.
(4) Controlling oviposition by means of attractive ground traps.
(5) Preventing deposition of eggs by means of deterrents applied to the surface of the ground, or injected into the soil.

Preliminary trials respecting method No. 2 were started last November, but yielded negative results.

I have not hitherto alluded to these experiments, although of opinion that such work may prove of great value and is well worth following up.

This field of research is especially fascinating from a scientific standpoint, seeing that it calls for a knowledge, not only of entomology, but of biology, chemistry, physics, &c.

The subject is, of course, too complex to admit of full discussion in this report, but I may mention that the results obtainable are entirely dependent on certain influences arising from the operation of various

natural laws that govern the movements of insects. For instance, we find that artificial light, whilst repellent to some species, is more or less attractive to others. The moth or beetle that flies into the lamp flame, however, must not be held accountable for such action, as it is merely responding to the influence of forces over which it has no control. Similarly, decaying animal matter emits an odour that compels blowflies and other insects to approach and settle on it, and, whilst under its domination, to deposit eggs that later on produce maggots destined to serve a useful purpose in the economy of nature.

We may, therefore, reasonably assume that the movements of our mealy-back cane-beetle are determined by forces that probably exercise important influences on the flight of the adult female prior to oviposition.

Canegrowers might render valuable assistance in this connection if they would occasionally watch the beetles whilst swarming at dusk and, in the event of noticing abnormal numbers congregating on the ground, either close to the house or in the field, as though attracted to a particular spot or portion of land, &c., communicate at once with the Entomologist at Gordonvale.

Methods 1 and 3 have already received a share of attention and appear worthy of further investigation, but Nos. 4 and 5 have not hitherto been studied.

PRICKLY-PEAR AS STOCK FEED—EXPERIMENTS IN INDIA.

Prickly-pear Feeding Experiments (Horn, E. W., Department of Agriculture, Bombay, Bulletin 58 of 1913, Bombay, 1914).

In order to determine the possibility of using prickly-pear (Opuntia) as fodder during times of famine, some feeding experiments were carried out at the Government Civil Dairy, Kirdee. Six bullocks were fed with a mixture of 100 parts of prickly-pear to 6 parts of cotton seed at the rate of 72 lb. per 1,000 lb. live weight per day for six months. The prickly-pear was prepared for consumption by first burning off the spines over a stove and then cutting the slabs into small pieces my means of a chaffcutter or a chopper; the burning was accomplished at various rates, from 30 to 100 lb. per hour according to the stove used.

The animals were in very poor condition at the beginning of the trial, and all improved markedly as time went on; four out of the six took the ration readily from the first, while the other two were longer in getting accustomed to it. The fodder was also fed successfully to a mixed dairy herd of cows and buffaloes in quantities up to 14 lb. per head per day and to young stock. Altogether, as a result of the trials, it may be said that the mixture of prickly-pear and cotton seed used will not only support life but enable an animal to regain condition even after it has become very poor from semi-starvation.—"Monthly Bulletin of Agricultural Intelligence and Plant Disease."

General Notes.

WOMEN AND THE WAR.

Every woman who, by working, helps to release a man or to equip a man does National War Service. In the country districts, the right kind of war work is to help in every way practicable to produce and harvest as much food as possible.

KEEPING MILK SWEET IN HOT WEATHER.

A pinch of carbonate of soda will keep milk or cream sweet in hot weather. In hot weather, when meat is likely to be tough, dip it in vinegar before cooking. This will make it tender. Milk will remove inkstains from carpets, tablecloths, &c., if applied directly.

DESTROYING TIMBER BY POISON.

Frilling trees and applying an arsenic solution gives good results. For the preparation of the poisonous solution the Agricultural Chemist recommends the use of caustic soda instead of washing soda, as no boiling is required. Mix dry arsenic (3 lb.) with caustic soda (1½ lb.) and add water slowly. Make up to 5 gallons; 5 lb. of saltpetre can be added to aid burning. Strong sulphuric acid mixed with nitric acid has been tried for the purpose, but found to be practically useless. Only in the case of very soft scrub timber does an injection of acid bring about decay. The addition of saltpetre to the arsenic solution facilitates burning.

PREVENTION OF HOG CHOLERA.

An American farmer, writing on this subject, gave his own experience of the use of wood-ashes as a cure for hog cholera:—"Now more than sixty years ago I read in a farm paper that wood-ashes would prevent cholera. At once I filled a lard tin with ashes and carried the ashes to the five hogs left, and they devoured the ashes as so much corn mush. I had lost then nearly 200 hogs. Since then I have given my hogs wood-ashes, and never have lost one. Before this when I killed my hogs I would have to throw away nearly all the livers because they were so diseased. I would find worms 10 in. long, and as large as a cedar pencil, in the entrails. Now livers are all good and sound, and there are no worms in bowels. Before using ashes the hogs were very hard to fatten; now I have no trouble in this respect."

It is stated that where sour milk is fed to hogs they seldom fall victims to hog cholera, when they are otherwise kept in good condition.

A HANDY DEVICE FOR GROWING FERNS.

It is surprising (says "South African Gardening and Home Life," 15th September) what an ingenious brain can do with only a few oddments, and an instance of this was brought to our notice a few days ago, when a friend introduced us to the method of growing ferns here described.

Out of an old porous land drain, a flower pot, and some virgin cork he had made one of the most effective fern holders we have ever seen. We were surprised at the success of this simple method, and have, therefore, decided to illustrate it at once.

Our friend takes a good-sized flower pot or fern basket, blocks up the hole at the bottom of the pipe, and then inserts it, as shown in Fig. 7. Round this he packs soil, ramming it in tight, so as to support the

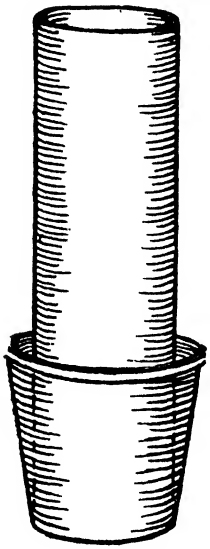


FIG. 1.

FIG. 2.

drain. If a basket is used, and it had been employed in several cases with great success, then the bottom end of the drain is plugged. The next thing to be done is illustrated in Fig. 2, when soil is clamped round the drain pipe and held in place by good broad pieces of virgin cork. The cork leans slightly away from the pipe, in order to form pockets in which to plant ferns. By careful selection of the pieces of cork used, this can be done quite naturally, because the rugged twisted surfaces lend themselves to this arrangement, and it is really easier to accomplish than it sounds. The cork should be fastened with stout wire round the pipe and securely fixed. It is important that this be carefully done, for, should the cork become loose when the ferns are at their best, the soil will be disturbed and the whole ruined.

Fig. 3.

Fig. 3 shows the device planted. Most kinds of ferns are quite suitable for this purpose; Adiantums (Maiden Hair), Nephorolepsis, Aspleniums, Platyceriums (Stag's Horn), are perhaps the best.

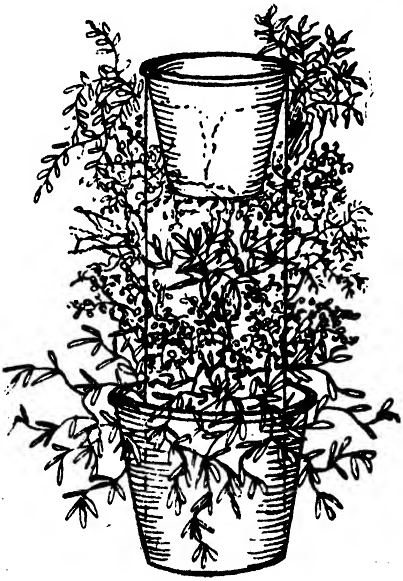


Fig. 5.

Fig. 6.

In the top of the pipe a specimen fern, in a pot, of such size that the rim of the pot rests upon the rim of the pipe, is placed (Fig. 5); this gives the finishing touch to the ferny pillar. But, perhaps, some readers are thinking that it will be a hopeless task to keep the roots moist during the hot weather. This, however, is just where the device

scores, and less difficult watering is experienced than by growing ferns in the ordinary pots or tins. Every day the pipe must be filled up, as shown in Fig. 5, but no further thought need be bestowed on the ferns throughout the day. The water in the pipe oozes through to the soil round the pot, providing almost ideal watering, as the water does not lie about the crowns of the plants, but at the top of the roots, just where it is needed, and upon removing a portion of the soil from the side of one of the pipes we found that the roots of the ferns were clinging to the surfaces of the pipe. The prettiest arrangement we saw was that of *Asparagus plumosus* planted in the lower pot with a maiden hair fern up the sides of the pipe, and an ostrich feather fern in the pot at the top.

FIG. 4.

Another very pretty pole was made of a mixture of ferns, and, perhaps, for interest this might be considered the most desirable arrangement, for many classes and varieties of ferns were growing together. Side by side, for instance, were seen the fine pinnate fronds of the Maiden Hair and the solid horny ones of the Stag's Horn fern; Bird's-nest ferns, with their stiff upright fronds, formed a striking contrast to the Spider ferns (Pteris). In short, in this wonderful device we had a regular fernery, and by no other means with which we are acquainted could such variety of plant life be suitably collected into natural surroundings.

Some readers may prefer the use of the hanging basket instead of a pot at the base of the pipe; and, when it is desired that the whole shall hang, the chain or the iron supports of the basket should be opened, fastened to a piece of wire run round the pipe towards the top, and the wires run from this over the head of the pipe, jointed together, and fastened to a hook in the usual way for hanging. The advantage of this method is that a much longer pipe can be used, as, of course, in this case, the fernery will hang and not have to stand, as when a pot is employed. Both methods, however, have their particular advantages. When a pot is used at the base, the pot at the top is more easily removed, because there are no strands of wire to get in the way, but the hanging arrangement is certainly more artistic, especially if advantage is taken of the chains or wires that support the basket, to train up varieties of climbing subjects, such as *Smilax, Asparagus plumosus nana,* &c.

LONG MOTOR TOUR.

2,650 MILES THROUGH QUEENSLAND.

What is perhaps one of the longest motor tours ever undertaken throughout Queensland has just been completed by Mr. G. W. Whatmore, director and manager of the Ford Motor Company, accompanied by his brother, Mr. J. S. Whatmore, of Sydney, the latter coming to Brisbane expressly for the trip, the object of which was to personally visit the "Ford" Agents throughout Central and Western Queensland.

Mounted on a 20-h.p. "Ford" single seater car they left Brisbane on Saturday afternoon, the 25th September, Mr. T. R. Hall, of Brisbane, accompanying them as far as Toowoomba, where a halt was made for the night. Miles was reached the next evening; thence the journey was continued and the subsequent days' drives finished at the following towns.—Roma, Morven, Charleville, Listowel Downs, Blackall, Longreach, Winton, Mackinlay, Cloncurry, Gilliatt, Hughenden, Muttaburra, Aramac, Banchory Station, Emerald, Planet Downs, Taroom, Miles, and Brisbane, covering in all a distance of 2,650 miles.

Considering the drought conditions, taken as a whole, the roads may be classed as excellent, and the journey, which occupied three weeks, was completed without any difficulty whatever. Generally speaking, the condition of the country, which is in the grip of one of the severest droughts on record, is perhaps as bad as it is possible to imagine; in fact, the city folk have not the faintest conception of the appalling conditions which exist. The stock, both sheep and cattle, is being seriously depleted. Even with the millions of stock in the country it is a struggle which cannot endure indefinitely, and unless the drought terminates at an early date there will be still greater losses. Certain of the localities mentioned have been favoured with light to moderate rains during the past few months, and the wonderful response of grass and herbage is reflected in the condition of the stock, but unless further rains occur the spring herbage will be dried up by the summer heat, with the consequences which need not be described.

Conspicuous use has been made of scrub timbers in an endeavour to keep life in the starving stock. For hundreds of miles mulga, mallee, and coolabah scrubs have been cut down, but, unfortunately, in many localities only small quantities of the above edible scrubs are left standing, so that unless rain falls at a very early date the position of the stockowners can be better imagined than described. Indeed, so desperate have matters become that endeavours are being made to keep life in the stock by feeding them on prickly-pear, which, unfortunately, abounds in some of the richest country in Queensland. Whilst on this question it might be interesting to the community to know that the prickly-pear pest is rapidly spreading over all parts of Central Queensland. Its insidious growth is so vicious that once it takes root it is almost impossible to eradicate it. Practically the whole of the country from Toowoomba to Morven, a distance of 350 miles, is thickly infested to such an extent that the road in places is almost impassable. A slight idea of the seriousness of the situation may be gathered when it is mentioned that the cost of clearing the pear is greater than the value of the land, the consequent result being that the pest is allowed unrestricted freedom to spread in all directions, and this vast area forms a propogating nursery whereby the seed is disseminated to germinate in localities situated hundreds of miles distant, being conveyed by passing cattle, birds, and wind: in fact, heavy growths of prickly-pear were seen as far north as Springsure. The only serious attempt at eradication appeared to be at Dulacca, where the syndicate controlled by Mr. Roberts has been endeavouring to exterminate it by means of poisonous gas. For upwards of 10 miles the effect of gas was apparent on the pear leaves. Its effect is to cause a brown discolouration which, outwardly, indicates a withering and dying of the leaf, but the treatment does not apparently penetrate into the sap, as on all sides can be seen the spring growth of young healthy off-shoots. The community at large have no conception of the great pear curse which, apparently uninterruptedly, is spreading itself over millions of acres of the best of Queensland country.

For upwards of 2,000 miles rabbit-proof fences were seen, though, strange to say, not one single rabbit could be seen, the drought apparently being responsible for this.

It is not, then, to be wondered at that the price of beef and mutton is extraordinarily high.

Even the wheat growing, in so far as the attempts which have been made between Toowoomba and Roma are concerned, are melancholy failures, and the "looked for" fields of grain have been converted into temporary pasturage for starving stock. On one station passed through 1,000 sheep were found in one flock suffering through eating heart-flower scrub, a poisonous weed growing near Aramac.

Many rivers were crossed, including Maranoa, Langlo, Barcoo, Thompson, Alice, Alpha, Nogoa, Comet, Dawson, and Warrego, &c., but all were rivers in name only,

being, in fact, nothing but dry sand beds to negotiate which, however, did not offer much difficulty to the "Ford" car.

One of the significant features observable during the trip, and more particularly in the drought-stricken area, is the common use of motor cars and motor lorries against old time horse teams, owing to the fact that the country is so abnormally dry, and, in the absence of natural grass, horses have to be stable fed. It can be easily understood, therefore, that with chaff costing upwards of 4d. per lb., it makes the use of horses almost prohibitive, and the timely intervention of the motor car to the man located, in many cases, hundred of miles from the nearest railway, is a boon not measured by words. Any taxation therefore on the motor car should receive very careful consideration at the hands of the Legislators before being imposed.

Mr. Whatmore was more than pleased at the results of his visit, and speaks in glowing terms of the wonderful demand for "Ford" cars in all parts of Queensland, in connection with which it may be mentioned that two vessels—the "Kilpurney" and the "Howth"—are coming direct to Brisbane and are now due with no less than 314 "Ford" cars, all for Queensland. The significant feature lies in the fact that the bulk of the above shipment is already sold. The Queensland Motor Agency, Limited, who are the agents for the "Ford" cars in Queensland, however, have further large shipments coming regularly to Brisbane, including the steamer "Bericklaw," which is coming direct to Brisbane, *viâ* Panama Canal, with 84 "Ford" cars for this State.

SCRUB TICKS AFFECTING DOGS, FOALS, CALVES, AND SHEEP.

By W. G. BROWN, Instructor in Wool and Sheep.

In consideration of the losses sustained from the scrub tick pest, too much prominence cannot be given to a cure. Mr. A. H. Cory, Chief Inspector of Stock, advises me that the treatment given below is an excellent remedy against scrub-tick poisoning.

Scrub ticks cause a great deal of trouble to stockowners in certain districts, with a large percentage of mortalities. It has been stated that these ticks do not harm the animals during the first four days' attachment, so it is recommended that, where scrub ticks are prevalent, valuable animals should be thoroughly examined every second or third day.

It has been proved that trypan blue, injected under the skin, is a specific for this disease in the dog. The paralysis soon improves, and in a few days the animal thoroughly recovers. One dose of the trypan blue is usually sufficient.

A 2 per cent. solution (about 9 grains to a fluid ounce of water) is made by dissolving the trypan blue in boiling water. A sediment falls as the solution cools, and this should be removed by filtering through a funnel, in which a properly folded filter paper is placed, or a fine piece of clean linen which has been previously boiled.

The hypodermic syringe and needle, before being used, should be placed in a dish containing cold water, then placed over the fire and the water boiled for some ten minutes; this thoroughly sterilises the syringe and needle, which is now ready to use when the solution to be injected has cooled.

The injection can be made anywhere under the skin, but the best positions are either in front of the chest or behind the shoulder, the skin in these positions being loose a fold of which is easily caught up by the finger of the left hand, whilst the needle is inserted with the right hand.

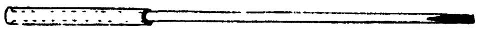
It is advisable to clip off the hair and disinfect the spot chosen before introducing the needle.

The dose for dogs, according to age and size, varies from 1 to 5 drachms or 1 to 5 teaspoonsful. The dose for calves, foals, and sheep, according to age and size, from ½ oz. to 2½ oz. or 1 to 5 tablespoonsful.

DESTROYING ZAMIA PLANTS.

With reference to the destruction of Zamia Plants, Mr. T. Kitchen, Cattle Creek, Mount Morgan, writes:—

I read in my last Journal (1st October) Mr. J. F. Bailey's mode of destroying the Zamia Plant. Having myself had some experience of destroying Zamia without the use of poison, I am forwarding you the method I use. Get a blacksmith to put a sharp chisel point on a 5-ft. crowbar, weld a ring 18 in. from top of bar, slip over top of bar a piece of piping and weld head on top to keep piping in place. Sew a piece of



leather over the piping, which prevents any jar on the hands when the bar is ready for use. Drive the bar in a slanting direction into the plant close to the ground, repeat on the opposite side and lever the top off the plant. Next drive the bar down the middle of the petals and lever from side to side, which will burst all the remaining butt and always proves fatal. The idea of the bar is to get easier driving power and better leverage. My neighbour, Mr. Jones, has cleared upwards of 2,000 acres, and I myself have cleaned my paddocks with one operation. I can recommend the above as a quick and effective way of destroying Zamia.

THE QUEENSLAND TREASURER'S FINANCIAL STATEMENT.

We have to acknowledge receipt, by the courtesy of the Hon. the Treasurer, of the Financial Statement for the year 1914-1915.

Answers to Correspondents.

MANGE IN HORSES.

J.O.B., Boonooroo—

Wash the affected parts with warm water and soap, and, when dry, rub in the following dressing twice a week:—Sulphur, 1 lb.; spirits of tar, 2 oz.; olive oil, 1 quart.

POWDERY MILDEW ON ROSES.

"Inquirer," Dalby—

Some varieties of roses are more susceptible to the attacks of mildew than are others. In these cases, it is advisable as a preventive to, every now and again, dust flowers of sulphur over the plants. Nicholson recommends the following preparation for the disease:—

Boil 1 lb. of flowers of sulphur (or in the proportion required) and 1 lb. of quicklime in 5 pints of water in an earthenware pot for ten minutes. Constantly stir while boiling; then, allow to settle, and pour off the clear liquid for use. The plants should be syringed with a mixture of this preparation diluted with 100 times its bulk in water.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

COMPUTED BY D. EGLINTON, F.R.A.S.

Date.	September.		October.		November.		December.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·4	5·33	5·30	5·47	4·59	6·4	4·46	6·27
2	6·3	5·33	5·29	5·48	4·58	6·4	4·46	6·28
3	6·2	5·34	5·28	5·48	4·58	6·5	4·46	6·28
4	6·1	5·34	5·27	5·49	4·57	6·6	4·46	6·29
5	6·0	5·35	5·26	5·49	4·57	6·6	4·46	6·29
6	5·59	5·35	5·25	5·50	4·56	6·7	4·46	6·30
7	5·58	5·36	5·24	5·50	4·55	6·8	4·46	6·30
8	5·57	5·36	5·23	5·51	4·54	6·9	4·47	6·31
9	5·56	5·37	5·22	5·51	4·53	6·10	4·47	6·32
10	5·55	5·37	5·21	5·52	4·53	6·11	4·47	6·33
11	5·53	5·38	5·20	5·52	4·52	6·11	4·47	6·34
12	5·52	5·38	5·19	5·53	4·51	6·12	4·47	6·35
13	5·50	5·38	5·18	5·53	4·51	6·12	4·48	6·36
14	5·49	5·39	5·17	5·54	4·50	6·13	4·48	6·36
15	5·48	5·39	5·16	5·54	4·50	6·14	4·48	6·37
16	5·46	5·40	5·15	5·55	4·49	6·15	4·49	6·38
17	5·45	5·40	5·14	5·55	4·49	6·16	4·49	6·38
18	5·44	5·41	5·13	5·56	4·48	6·16	4·50	6·39
19	5·43	5·41	5·12	5·56	4·48	6·17	4·50	6·39
20	5·42	5·42	5·11	5·57	4·48	6·18	4·51	6·40
21	5·41	5·42	5·10	5·57	4·48	6·19	4·51	6·40
22	5·40	5·43	5·9	5·58	4·47	6·20	4·52	6·41
23	5·39	5·43	5·8	5·58	4·47	6·21	4·52	6·41
24	5·37	5·44	5·7	5·59	4·47	6·21	4·53	6·41
25	5·36	5·44	5·6	5·59	4·47	6·22	4·53	6·42
26	5·35	5·45	5·5	6·0	4·47	6·23	4·54	6·42
27	5·33	5·45	5·4	6·0	4·47	6·24	4·54	6·42
28	5·32	5·46	5·3	6·1	4·47	6·25	4·55	6·43
29	5·31	5·46	5·2	6·1	4·47	6·26	4·55	6·43
30	5·30	5·47	5·1	6·2	4·47	6·27	4·56	6·44
31	...	...	5·0	6·3	...	...	4·56	6·44

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H.	M.	
2 Sept.	☽	Last Quarter	12	56	a.m.
9 „	●	New Moon	8	52	p.m.
16 „	☾	First Quarter	5	21	„
23 „	○	Full Moon	7	35	„

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 14th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

1 Oct.	☽	Last Quarter	7	44	p.m.
9 „	●	New Moon	7	42	a.m.
15 „	☾	First Quarter	11	51	p.m.
23 „	○	Full Moon	10	15	a.m.
31 „	☽	Last Quarter	2	39	p.m.

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

7 Nov.	●	New Moon	5	52	p.m.
14 „	☾	First Quarter	9	3	a.m.
22 „	○	Full Moon	3	36	„
30 „	☽	Last Quarter	8	10	„

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

7 Dec.	●	New Moon	4	3	a.m.
13 „	☾	First Quarter	9	38	p.m.
25 „	○	Full Moon	10	52	„
29 „	☽	Last Quarter	10	59	„

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October t will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1st December it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR OCTOBER, 1915.

Article.		OCTOBER. Prices.
Bacon	lb.	1s. 2d. to 1s. 3d.
Bran	ton	£4 15s.
Broom Millet	„	£38 to £40
Butter	cwt.	140s.
Chaff, Mixed	ton	£7 10s.
Chaff, Oaten	„	£7 10s. to £9
Chaff, Lucerne	„	£10 to £12
Chaff, Wheaten	„	£4 to £5
Cheese	lb.	11d.
Flour	ton	£17 10s. and £12
Hams	lb.	1s. 3d.
Hay, Oaten	ton	£9
Hay, Lucerne	„	£6 to £7
Honey	lb.	3d. to 3½d.
Maize	bush.	5s. 4d. to 5s. 5d.
Oats (Japanese)	„	3s. 6d. to 5s.
Onions	ton	£9 10s. to £12
Peanuts	lb.	3d. to 4d.
Pollard	ton	£6 10s.
Potatoes	„	£15 15s to £16 5s.
Potatoes (Sweet)	cwt.	3s. to 3s. 9d.
Pumpkins	ton	£8 10s. to £9 10s.
Eggs	doz.	1s. to 1s. 1d.
Fowls	pair	4s. to 6s.
Ducks, English	„	4s. to 5s.
Ducks, Muscovy	„	6s. to 7s.
Geese	„	7s. to 8s.
Turkeys (Hens)	„	11s. to 12s. 6d.
Turkeys (Gobblers)	„	13s. to 14s.
Wheat	bush.	8s. 9d.

VEGETABLES.

Cabbages, per dozen	3s. to 4s. 4d.
Cauliflowers, per dozen	...
Beans, per sugar bag	2s. to 3s. 6d.
Beetroot, per dozen bunches	6d to 9d.
Carrots, per dozen bunches	9d. to 1s 3d.
Chocos, per quarter-case	1s. 9d. to 2s. 6d.
Cucumbers, per quarter-case	1s. 6d. to 2s. 6d.
Custard Marrows, per dozen	1s. 6d. to 3s. 6d.
Vegetable Marrows, per dozen	1s. 6d. to 4s.
Parsnips, per dozen bunches	1s. to 1s. 3d.
Lettuce, per dozen	...
Peas, per sugar bag	3s. to 6s. 6d.
Celery, per dozen bunches	10d. to 1s. 6d.
Sweet Potatoes, per cwt.	3s. to 3s. 9d.
Table Pumpkins, per cwt.	8s. 6d. to 9s. 6d.
Tomatoes, per quarter-case	3s. to 7s.
Turnips, per dozen bunches	8d. to 9d.
Rhubarb, per bundle	1s. to 1s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	OCTOBER. Prices.
Bananas (Queensland), per case	12s. to 15s.
Bananas (Fiji), per case	16s. to 18s.
Bananas (G.M.), per case	...
Loquats (Giant), per case	5s. 6d. to 11s.
Mandarins, per case	10s. to 12s.
Mangoes, per bushel-case	12s. to 14s.
Oranges (Navel), per case	...
Oranges, per case	11s. to 13s.
Passion Fruit, per half bushel-case	1s. 6d. to 9s.
Lemons, per bushel case	8s. to 9s.
Papaw Apples, per half-case	7s. to 9s.
Pineapples (Queens), per case	8s. to 12s.
Pineapples (Ripleys), per case	9s. to 11s.
Pineapples (Common), per case	8s. to 10s.
Strawberries (Queensland) per tray	4s. 6d. to 6s.
Tomatoes, per quarter-case	7s. to 10s.
Cucumbers, per bushel-case	6s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	OCTOBER. Prices.
Apples (Tasmanian), per case	11s. to 13s.
Apples (Croftons), per case	...
Apples, Cooking, per case	10s. to 12s.
Bananas (Cavendish), per dozen	2d. to 4d.
Bananas (Sugar), per dozen	$1\frac{3}{4}$d. to $2\frac{3}{4}$d.
Cape Gooseberries, per quarter-case	7s. to 10s.
Cocoanuts, per sack	12s. to 15s.
Cumquats, per quarter case	2s. 6d. to 4s.
Custard Apples, per quarter-case	5s. to 8s.
Granadillas, per quarter-case	...
Lemons (Lisbon), per case	6s. to 8s.
Limes (Choice), per case	2s. to 3s. 6d.
Loquats, per quarter-case	2s. 6d. to 3s. 6d.
Mandarins, per half-case	3s. to 5s.
Mangoes, per case	5s. to 7s.
Oranges (Navel), per case	6s. to 8s.
Oranges (other), per case	6s. to 7s.
Papaw Apples, per case	1s. 6d. to 3s. 6d.
Papaw Apples (Prime), per quarter-case	2s. 6d. to 4s. 6d.
Passion Fruit, per case	7s. to 10s. 6d.
Peanuts, per pound	3d. to 4d.
Rosellas, per sugar bag	..
Pineapples (Ripley), per dozen	8s. to 9s. 1d.
Pineapples (Rough), per dozen	3s. to 6s.
Pineapples (Smooth), per dozen	3s to 6s 6d.
Strawberries, per dozen pint boxes	4s. 6d. to 10s. 6d.
Strawberries, per tray	4s. 6d. to 6s.
Tomatoes, per quarter-case	3s. to 7s.

TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1915.

Animal.	SEPTEMBER. Prices.
Bullocks	£20 to £31
Cows	£15 2s. 6d. to £18 7s. 6d.
Merino Wethers	40s. 9d.
Crossbred Wethers	66s.
Merino Ewes	33s. 6d.
Crossbred Ewes	42s.
Lambs	37s.
Pigs (Porkers)	39s.

LONDON QUOTATIONS.

Jute: October-November shipment, £25 per ton.

Cotton: The Liverpool quotation for Middling American cotton, October-November shipment, is 7.15d. per lb.

Sisal: October-November shipment, £34-£36 per ton.

Rubber: October-November shipment—Fine hard Pará, 2s. 5½d. per lb.; plantation first latex crepe, 2s. 6½d.; smoked sheet, 2s. 5⅜d. per lb.

Copra, South Sea: October-November shipment, £24 2s. 6d. per ton.

Danish butter, 205s. to 209s. per cwt. "The Grocer" states that the opening prices for Colonial butter may be 170s. to 180s. per cwt.

Orchard Notes for December.

By A. H. BENSON, Director of Fruit Culture.

THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about under the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry, see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country.

THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carroty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish slumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for Codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated. Watch the vines carefully so as to detect the first signs of Oidium or Anthracnose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry, keep the orchard and vineyard well cultivated; and where the citrus and other fruit trees require it, give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and, consequently, to carry badly.

Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

FIELD.—The wheat harvest will be now nearing completion, and to all appearance the results are not likely to constitute a record, owing to the dry weather during the growing months, and the yield promises to be somewhat unsatisfactory to the wheat-growers. The principal factor operating against a still greater extension of the wheat-growing industry is, that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

The dry weather which prevailed during several months gave rise to grave fears for the harvest, but the subsequent timely rainfall came just in time to save the crop in some of the wheat districts. The estimates of the probable yield have varied so considerably that it will be well to wait until the harvest is over before calculating on the result.

Given favourable weather, maize, panicum, imphee, Kafir corn, and sorghum may be sown. Arrowroot, ginger, and sweet potatoes may be sown.

KITCHEN GARDEN.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

FLOWER GARDEN.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

QUEENSLAND AGRICULTURAL JOURNAL

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Agriculture.

SCIENCE AND AGRICULTURE.

There are many farmers who poke fun at the scientific man who is trying to help agriculture, and at the "scientific" farmer (says "Garden and Field"). They assert that agriculture has nothing to learn from science, and they are quite content, they say, to go along the old lines.

Let us see now whether their assertions are correct. Smut disease is very prevalent this season in oatfields where untreated seed was planted, but is quite scarce in fields where treated seed was planted. This loss will amount to 15 or even 20 per cent. of the crop. Who devised the method of treatment? The scientific man. Who devised methods of spraying fruit trees and potatoes against insects and fungous disease? Again the scientific man.

Who gave us the information regarding the importance of clover and other leguminous crops in maintaining the supply of nitrogen in the

soil, and who furnished the information we now possess regarding fertilisers? Again, the scientific man. Who made the wonderful discovery regarding the part played by bacteria in dairying, in canning, in the keeping of food products? Who gave us knowledge of many of the diseases of live stock, so that we are able to guard the health of our animals? Again, the scientific man.

Who worked out practical systems of ventilation in barns and houses, and who made the wonderful improvements in farm machinery? Again, the scientific man. Who gave us the Babcock test? A scientific man. Who has given the improved breeds of cattle, the improved strains of grains? The scientific man.

And so we might continue our list of contributions of science to agriculture—in fact, there is not a single department of agriculture that has not been greatly benefited by science, and yet there are men who have no use for science! Every number of this paper contains contributions from science to agriculture. Present-day farming is largely the application of scientific methods to agriculture.

One important lesson we may draw from the foregoing remarks:—The average farmer can become a scientific farmer by intelligent reading of the best agricultural papers and bulletins. "The art of farming we learn by our hands; the science of agriculture we must learn from the investigations of men of science."

In the preface to a booklet issued by the Department of Agriculture and Stock, Queensland, entitled "Elementary Lessons in Agriculture," in 1908, the following remarks on "Agriculture and Science" will be found:—

"Agriculture to-day is no longer what it was in the early days of settlement in Queensland. Fifty years ago men began farming on rich scrub lands with no other capital than a few tools, strong arms, and determination. Few crops were then grown except corn and potatoes, and perhaps a little lucerne. No science was required; neither ploughs nor horses, nor up-to-date agricultural implements were seen on a farm, nor, indeed, could they have been used. The axe, the hand hoe, and the fire-stick were the means with which the old-time farmer carved out a home for himself, and did so successfully. But times have changed, conditions have altered, and he who would to-day become successful in the pursuit of Agriculture must be armed with a knowledge of the most modern methods of cultivating the soil, combating pests, &c.; and, to achieve his purpose, he must not only be a strenuous worker, but also a reader. His own methods may, to him, seem good, but they may have been improved upon, and all progress must be studied through the medium of agricultural journals and publications of many kinds dealing with the farming profession. If those who enter upon a farming life as a serious business will keep steadily before them that Science enters largely into the occupation of the farmer, the orchardist, the dairy farmer, market gardener, and stock-breeder, and will make it their business to utilise all they can of the means placed at their disposal by

Science, they cannot fail to overcome most of the difficulties with which they have to contend in the way of climatic conditions and of the numerous pests which tax the patience and ingenuity of the man on the land.''

COMPLETE FERTILISERS FOR FARM, ORCHARD, AND VEGETABLE GARDEN.

In many localities a heavier dressing of artificial fertilisers may be profitable, using, for instance:—

$$\left.\begin{array}{l}\text{2 cwt. superphosphate}\\ \text{1 cwt. sulphate of potash}\\ \tfrac{1}{2}\text{ cwt. sulphate of ammonia or nitrolim}\end{array}\right\}\text{ per acre;}$$

or about ½ lb. of the mixture to each vine.

Green manuring, in addition to the yearly application of artificial fertilisers, is strongly recommended, and the crop should be ploughed under to a depth of at least 9 inches.

Liming the soil every five or six years, with about 1 ton of air-slaked lime or gypsum per acre, may also be very profitable.

LEMONS (LIMES AND CITRONS).

Citrus fruits may be grown from one end of the State to the other, provided that the soil is suitable, and for this reason the careful selection of the soil is of the greatest importance. The soil need not be extremely rich, but must be in good mechanical condition, friable and perfectly drained, with a free, porous subsoil. The soil most suitable is a deep, sandy loam, of reddish, brownish, or chocolate colour, and fairly rich in humus and lime. Clayey subsoils must be avoided.

Lemons grow and bear well in the coastal district, but the fruit is not of a high quality, and better results are obtained inland. Limes and Citrons, however, do particularly well along our eastern seaboard.

As soon as the trees come into bearing the use of artificial fertiliser will become profitable, both in regard to quantity and quality of the fruit. It is always best if the use of artificial fertiliser is combined with application of either farmyard manure, compost, or green manure.

A standard manure for citrus fruits can be made up, in accordance with any of the following formulæ:—

$$\left.\begin{array}{l}\text{3 cwt. superphosphate}\\ 1\tfrac{1}{2}\text{ cwt. sulphate of potash}\\ \text{2 to }3\tfrac{1}{2}\text{ cwt. of sulphate of ammonia or nitrolim}\end{array}\right\}\text{ per acre;}$$

or,

$$\left.\begin{array}{l}\text{2 cwt. Thomas phosphate}\\ 1\tfrac{1}{2}\text{ cwt. sulphate of potash}\\ \text{3 to }4\tfrac{1}{2}\text{ cwt. dried blood}\end{array}\right\}\text{ per acre;}$$

or,

$$\left.\begin{array}{l}\text{4 cwt. meatworks manure (with blood)}\\ 1\tfrac{1}{2}\text{ cwt. sulphate of potash}\\ 1\tfrac{1}{2}\text{ cwt. nitrate of lime or nitrate of soda}\end{array}\right\}\text{ per acre.}$$

The same quantities in pounds may be applied to trees of medium size, bearing in mind that trees about five years old require from 4 to 6 lb. of any of the above complete fertilisers, and that the amount can be increased up to 20 lb. per tree for very old large trees.

Fertilisers should be supplied regularly every year, and the manure should be well forked, chipped, or cultivated in.

In an old orchard the manure should be applied broadcast over the whole area. It is always advisable to divide the above quantities of manures into two lots, and apply one-half towards the end of winter, in July or August, and the other in December or January.

In order to allow anyone who has only a few trees to make up a dressing for each tree, a few complete fertilising mixtures are added, of which the lesser amounts ore for young trees and the large amounts for older trees:—

1.

2 to 6 lb. superphosphate
1 to 2 lb. sulphate of potash
2 to 4 lb. dried blood.

2.

2 to 6 lb. superphosphate
1 to 2 lb. sulphate of potash
1 to 3 lb. nitrolim or sulphate of ammonia.

3.

4 to 8 lb. bonedust
1 to 2 lb. sulphate of potash
2 to 4 lb. dried blood.

4.

3 to 7 lb. Thomas phosphate
1 to 2 lb. sulphate of potash
2 to 4 lb. nitrate of lime or nitrate of soda.

5.

4 to 16 lb. of a ready mixed fertiliser containing about 6 per cent. of water-soluble phosphoric acid, 10 per cent. of potash, and from 6 to 10 per cent. of nitrogen.

MANGO.

This tree will grow in almost any soil, from a sand to a heavy loam, amongst rocks, on gravelly and on shaley soil; it will thrive best, however, on a good loamy soil, containing plenty of lime, and under tropical conditions, as it will not stand heavy frosts. Young trees benefit mostly by a good mulching with farmyard manure. Older trees may be fertilised with artificial manures, applied in holes made by driving a crowbar into the ground, at intervals all round the tree, extending from 2 to 7 or more feet from the stem. A mixed fertiliser—

$\left.\begin{array}{l}\text{3 to 6 lb. superphosphate}\\ \text{2 lb. sulphate of potash}\\ \text{1½ to 2 lb. nitrolim or sulphate of ammonia}\end{array}\right\}$ per tree,

is distributed amongst the various holes, which are then covered or filled up with soil.

For very large trees the quantities of fertilisers may be nearly doubled.

ORANGES.

The general remarks made on the cultivation of citrus fruits, under the heading of "Lemons," apply to oranges and mandarins.

Several of the most favoured varieties of oranges and mandarins do remarkably well on our well-drained, rich volcanic scrub soils, others again, like for instance the Seville orange, can be grown on heavier soil than that most suitable to sweet oranges.

The application of artificial fertilisers is generally very profitable, and improves both quality and quantity of the fruit; the following facts, however, have to be borne in mind. Inorganic nitrogen, as nitrogen in form of sulphate of ammonia or of nitrolim, produces a light-coloured, thin-skinned sweet fruit, which is of more particular importance in the case of Navel oranges. Organic nitrogen, nitrogen in form of blood, meatworks manure, &c., produces oranges with darker and coarser skin. Potash produces also light-coloured and thin-skinned fruits, which are inclined to be acid.

THE CONTROL OF WEEDS.

The "Queensland Sugar Journal," of 7th October, contains the following interesting note on the destruction of weeds amongst sugar-cane by means of a poisonous spray, contributed to the June issue of "Sugar," by Mr. W. E. Cross, Chemist to the United States Agricultural Experiment Stations:—

It appears that a series of experiments was recently carried out by the United States Department of Agriculture in co-operation with some of the State Experiment Stations, and with a number of scientific farmers.

In the first series no cultivation whatsoever was given after planting, the weeds being destroyed by a sharp hoe used horizontally, without disturbing the soil any more than absolutely necessary; in the other series the usual cultivation was practised. The average results of all the experiments showed that the plots which had only been weeded produced 95 per cent. as much fodder as that given by the cultivated plots, and 99·1 per cent. as much grain. The experiments thus appeared to show that the destruction of the weeds is the only benefit to be obtained from the cultivation of corn.

In Hawaii experimental work has led to a similar conclusion with regard to the cane crop. While this conclusion appears to be in opposition to the opinion that it is advantageous to turn over the soil between

the rows, it is to be noted that that method of cultivation invariably causes the destruction of some of the roots of the cane, and that, moreover, the lack of cultivation during the last six to eighteen months of the crop does not prevent the cane developing as rapidly during this period as during any other stage of growth.

As a result of these conclusions much attention has been given in Hawaii to studying out the best methods of destroying the weeds. The system which would appear to be the most satisfactory is that of Agee and Eckart, in which the weeds are sprayed with arsenite of soda. Two special spraying apparatus have been invented—the sled sprayer and the knapsack sprayer. The sled sprayer consists of an iron tank of about 100 litres capacity carried on a sled 3 ft. wide; it has three spray nozzles at each end, and sometimes a pressure gauge. In the case of the hand or portable sprayer, the arsenite tank is carried knapsack fashion on the back, and the spraying carried out by means of a hose.

There are two problems of importance that such a method of destroying weeds presents. The first is as to whether the addition of arsenite to the soil would have a prejudicial effect on the growth of the cane. Investigations along this line have shown that the arsenic, immediately after the application to the soil, loses its caustic properties, owing to the action of the iron and aluminium of the soil. Moreover, experiments carried out in Olaa, in which arsenic was applied to the soil between the rows at the rate of 5 lb. per acre each week for six months, showed that the arsenic had no injurious effect on the growth of the cane plant.

The second problem, as to whether the poison employed in the process damages the cane itself, has also been answered in the negative. It is true that, even with the best apparatus, small quantities of the spray cannot be prevented from coming in contact with the leaves of the young cane occasionally. But this is not a matter of importance, because it at most occasions a slight check to the cane, from which it recovers entirely within a few weeks.

It may be said that this method of weed control already has passed the experimental stage, as it has been adopted as a part of the normal field work in the extensive plantation of solution used at present is 5 lb. of arsenite to 100 gallons of. Olaa. The procedure* there is as follows:—"The strength of water. It is Mr. Eckart's plan to do as much sled-spraying as possible, and to follow this, after a short interval, with a light hand-spraying to touch up the spots that may have been missed by the sleds. The cost of spraying at present is from 50 cents to 1 dollar for sled-spraying, and from 1 dollar to 1 dollar 25 cents for hand-spraying. The maximum amount of work for the sleds is 5 acres per day. The maximum for hand-spraying is a little over 1 acre."

The spraying should not be carried out during rain, but two hours after the rain the work may be started again. It has also been noticed that the middles remain clean for a much longer time after spraying

* Agee Bulletin 44 (Agricultural and Chemical Series), Hawaii.

than after the ordinary method of cultivation, so that often two sprayings are sufficient for the whole period of growth.

With respect to the economy of the new method, I may cite the following statement of a Hawaiian authority:—"By observing the proper rules and using ordinary intelligence, spraying can save a plantation in labour from 15 dollars to 30 dollars per year per acre."—Translated from "Revista Industrial of Agricole de Tucuman."

A NOVEL SILO.

A correspondent has a chimney length of half-inch thick iron from an old sugar-mill, with a diameter of 6 ft., and wishes to know how he can utilise it as a silo.

Mr. A. Morry, Surveyor to the Department of Agriculture and Stock, to whom the question was submitted, reports as follows:—

"The best way to utilise the chimney tube is to cut it through in the centre, thus giving two 15 ft. by 6 ft. tubes. These should be let into the ground about 12 ft., close together, leaving 3 ft. standing above the ground line.; 4 in. of good concrete (4—2—1) should then be put in the bottom of each for a floor, and well rendered so as to prevent water entering. Some water-proofing material, of which there are several kinds in the market, should be added to the concrete. A simple roof could be put over both silos, supported on bush timber, and a beam fixed over the centre of each, to which a block and pulley can be attached for convenience in emptying same. By this method, no portholes are required, nor appliances, such as elevators or blowers for loading, and the ensilage can be easily got out by means of the pulley block fixed as above stated, and attached to a light basket.

"The inside of the tubes should have two coats of cement wash before filling; and each time the silos are charged, a coat of either lime wash or cement should be given. These silos together will not hold more than 18 tons of chaffed and compressed silage."

THE DISCOVERY OF RADIUM IN COAL.

The "Fiji Planters' Journal" (September, 1915) takes from the "Scientific American" the following remarkable notes on the effects of a new product of coal, under the name of "lignaite," which has been discovered by two distinguished French chemists of Paris and Professor Scammell, M.S.C.I., of Hadleigh, Essex;—

By its use, it appears that radishes and other root crops are obtained nearly "five" times as large as those grown in untreated soil at the same time.

If this process could be generally adopted by our agriculturists in this country, the increase in the prosperity of the nation would be very large.

The initial cost of such a system has hitherto stood in the way of its general adoption.

But the recent discovery by MM. Detaille and Lafayaise, the two distinguished French chemists of Paris, and Professor Scammell, M.S.C.I., of Hadleigh, Essex, that coal contains radium, which, in the form of "lignaite," can be used for the radiumisation of the soil, places the process within the reach of every agriculturist in the country.

Fruits, flowers, and vegetables can be grown in a much "shorter" time, in much larger quantities, and of finer quality by the use of "lignaite," the cost of the treatment of an ordinary-sized garden being very trifling; the process is available for use by the humblest worshipper at the shrine of Flora.

Once more in the history of human progress the world is indebted to the brilliancy and originality of French scientific thought and research; and, with a view to enable the country at large to benefit by their discoveries, the eminent chemists mentioned are sending to all applicants full details of the best methods of applying the "lignaite" to the soil.

The importance of this discovery to the small landowner or cultivator is obvious; it is now possible for the man with 2 or 3 acres of ground to make a substantial profit each year, sufficient to keep his family and himself in comfort.

And this discovery—viz., medicatrix natural, the latest and most beneficent of the achievements of science—goes far to solve the land problem and pave the way for the reappearance of the sturdy peasant proprietor, the backbone of the country.

SEED POTATOES.

The Irish Department of Agriculture recommends not only the planting of seed potatoes whole, the size of a hen's egg, but that these should be immature, being dug before the tops have dried off. The reason given for this is that, once maturity is reached, deterioration begins to set in, the dying of the tops being an evidence of this. By lifting the tubers before that stage is reached, deterioration is arrested and the seed tubers are obtained at the time of their greatest vigour. We have often pointed out the advantages of sprouting seed potatoes before planting. (*See* Note on "Potato Planting," in the pamphlet on Market Gardening issued by this Department.) "Garden and Field" for November, 1915, says that the advantages claimed for sprouting are:—(1) It increases the yield by 25 per cent; (2) the crop matures earlier and can be lifted earlier; (3) sprouting enables planting to be done when conditions of weather and soil are most favourable, the sprouted seed being kept out of the ground for another week or two, if necessary, without detriment or actual loss of time; (4) there are fewer blanks, as no potato is planted that has not already started growth; (5) there will be less trouble from weeds, as the strong foliage developing from the sprouted seeds chokes, or, at least, checks, weeds so much that

they give very little trouble. Not more than two sprouts should be allowed to remain, and these should proceed from the rose end.

The difference in the results from sprouted and unsprouted seed was shown by an experiment made at the Queensland Agricultural College some years ago. A quantity of sprouted seed was selected from the barn, and planted; and at the same time, an equal quantity of unsprouted tubers were planted on an adjoining plot. The first lot quickly appeared above ground with scarcely a miss; the other lot came up much later, in a straggly manner, and there were about as many misses as there were plants.

THE PRICKLY-PEAR PEST.

The following remarks on Prickly-pear Destruction and Prickly-pear Selections appear in the last Annual Report of the Under Secretary for Lands:—

Considerable impatience has been manifested by holders of prickly-pear infested lands as to the results of Mr. O. C. Roberts' system of destroying the pear. Notwithstanding several drawbacks in the initial stages of his work, and further trouble caused by the European war, drought, &c., Mr. Roberts has made good progress in the destruction of the plants and the utilisation of the dead pear in the production of potash, and has demonstrated the effectual work of his arsenious trichloride gas system at a cost below anything yet obtained.

Pastoralists and selectors have again shown determination to deal with the clearing of their lands from prickly-pear and have done good work, the extent of which would have been increased but for the scarcity of labour for this kind of work and the droughty conditions prevailing generally.

The policy of the Department has been to encourage the selectors of prickly-pear lands as much as possible; and no forfeiture has been declared where the selector, although not strictly complying with the conditions, has shown a *bonâ fide* attempt to do so.

Pastoral Holdings.

The pastoral holdings leased without any special conditions of pear destruction and subsequently notified as pear-infested number 209. Of these 72 have been freed from pear by an expenditure of £5,485; 118 have been partially freed from pear at a cost of £65,099; while in the case of 19 holdings nothing has yet been done as regards the eradication of the pear.

Of the pastoral holdings to the number of 141 leased with a special condition providing for the destruction of prickly-pear, the condition in respect of 80 has been performed to date, at a cost of £16,780, and on the remainder, though the progress does not satisfy requirements, there has been an expenditure of £37,357.

Pear-infested Selections.

The total number of selections standing good on the 31st December, 1914, notified as pear-infested, is 3,043. This number is exclusive of prickly-pear selections and selections of land originally opened with a special condition providing for the destruction of prickly-pear. Of this number 1,286 have been entirly freed from pear by an expenditure of £39,156; 1350 have been partially freed at a cost of £125,138; while in the case of 407 infested selections no expenditure on pear destruction has yet been reported.

Of Agricultural and Grazing Selections applied for subject to a condition of pear destruction the condition has been satisfactorily performed in 82 cases, at a cost of £2,272 12s. 6d.; while in 82 cases in which the condition has not been fully satisfied, there has been an expenditure to the amount of £5,544 4s. 11d.

Prickly-pear Selections.

As regards Prickly-pear Selections, the main condition of the tenure has been satisfactorily complied with in 1,675 cases, at a cost of £92,541 3s.; while in 1,118 other cases the expenditure, though not up to requirements, reached the sum of £115,845 5s. 3d.

The total recorded expenditure for the year by pastoralists and selectors in destroying prickly-pear on pastoral holdings and selections of all tenures, not including those forfeited or surrendered during the year, is £98,888 8s. 10d.

The total recorded expenditure by lessees and selectors in destroying prickly-pear on pastoral holdings and selections of all tenures to 31st December, 1914, is £505,221 7s.

Experimental Station.

Work at the Experimental Station, Dulacca, was continued throughout the year under the supervision of Dr. Jean White-Haney, officer in charge. Dr. White-Haney's report on the work done is a detailed report covering all the experimental work now in hand.

WHEAT AND MAIZE CROPS OF THE UNITED STATES OF AMERICA FOR 1915.

No nation in the history of the world ever harvested a crop remotely to be compared, either in bulk or value, with the harvest of grain and fruit which the farmers of the United States have gathered this year. A large part of it will be sold to Europe's hungry and fighting millions. Remarkable as was the crop of 1914, in itself far excelling all previous records, the reports of the experts of the Department of Agriculture, compiled and made public, show that the harvest of 1915 will exceed it in almost every particular.

The wheat harvest this fall may possibly, for the first time in the history of the country, go above 1,000,000,000 bushels. Experts on prices

calculate this crop will stand the country in about 1,135,100,000 dollars (£227,020,000). The farmers are expected to put 960,000,000 dollars (£192,000,000) of this directly into their own pockets. The increase in the wheat crop is practically entirely due to the increased acreage under cultivation this year. The average yield per acre is slightly below that of last year, being put at 16·3 bushels to the acre. The maize crop, like the wheat, is threatening to pass another memorable mark, by turning out 3,000,000,000 bushels, the estimate now being 2,918,000,000 bushels. This is an increase over last year's yield of 245,000,000 bushels.

The expansion of the corn crop is due at once to an increased acreage under cultivation, and to a better yield per acre. This crop will probably represent close on three-fourths of the world's total production. The oat crop, the third of the three great leaders, has increased over last year's record, by nearly 25 per cent., the figures being—For this year, 1,402,000,000 bushels; for last year, 1,141,000,000 bushels. The year's barley crop will, it is estimated, amount to 217,000,000 bushels, or 22,000,000 bushels more than last year; the rye crop has been increased from 43,000,000 bushels to 44,000,000 bushels; the rice crop from 24,000,000 bushels to 30,000,000 bushels; 18,000,000 bushels of buckwheat have been raised, against 17,000,000 in 1914.

POTATO-GROWING IN CENTRAL QUEENSLAND.

Writing on 4th November, Mr. J. Newman, a successful farmer at Scrubby Creek, in the Rockhampton District, gives the following advice to potato growers:—

"The Potato (*Solanum tuberosum*), which takes second place only to the cereals as a food-producing plant, has, at the time of writing, become something of a luxury, as new potatoes are now selling in Rockhampton at £1 per cwt., and are being retailed there at 3d. per lb.

"Potato-growers are now busy harvesting and marketing their summer crop, which, in some localities, is turning out fairly well—all grown by irrigation.

"As this is the only crop in the year from which sets can be saved for the next planting (February-March), I give the result of my experience in the matter of keeping them, which is a somewhat difficult, and often disappointing business.

"The potato moth and its larvæ are, in nine cases out of ten, responsible for the destruction of seed potatoes in this district, and the old way of throwing the tubers in a heap, possibly on the ground, in some corner of the barn, and covering them with straw or bags, is simply courting disaster.

"For the February-March planting, sets are best planted whole on account of the great heat and moisture in the soil.

"Select your sets not less than 1½ in. in diameter, and fill into bags, and, as you fill in, dredge over them lightly a mixture of 1 lb. of black pepper, and one tin of insectibane, thoroughly mixed.

"Should any larvæ which may be in the tubers hatch out, they will be immediately asphyxiated, and any moths or other insects entering from outside will share the same fate.

"Set the bags on end on a boarded floor in a cool and dry place in the shed, and, once a month thereafter, turn all out and examine them; then, after discarding any bad ones, re-bag, sifting in a little more of the insectibane and pepper mixture.

"As planting time approaches it will be found that they have become somewhat shrivelled, and can be compressed between the finger and thumb like indiarubber; this is no detriment to them, as, after being planted, they will quickly absorb from the soil the water which the tropical atmosphere has extracted from them.

"Scrub land is the soil *par excellence* for this crop, and I know such land which has produced heavy crops twice a year by irrigation for the last twenty years, and is still doing it.

"The February-March planting is dug in May and June, and, as the winter planting commences in July, the farmer has a busy time. The July planting is a more simple matter, as the land is generally cool and moist, and in these conditions large potatoes may be used by cutting them into pieces, each bearing one or two eyes.

"The seed for this planting is imported from the South, and just here I would caution the grower against the Potato Blight (*Phytaphthora infestans*). I have seen it in seed imported from Sydney, and when planted I have seen the black spot on the leaf indicating its presence; but this was some years ago, and I believe the climate here is too dry for the disease ever to become a meance to our crops.

"To grow potatoes here farmers must have some kind of irrigation plant. Oil engines are not expensive, and my experience is that farmers never pay for them, because they pay for themselves, and, in addition, they pay to the farmer many times their own cost in clear profit in a few years."

AGRICULTURAL NOTES—THE LOCKYER DISTRICT.

By CUTHBERT POTTS, Principal of the Queensland Agricultural College.

Since my arrival at the College at the end of September, weather conditions have been extremely unfavourable; but it is at such a time as this that small variations in field practice show the most pronounced differences in results. Consequently, we are able to draw certain conclusions which should be of considerable value in subsequent years.

Hay Crops.—In regard to all these crops the time of planting was most striking; but even more pronounced was the time of ploughing. In one of the paddocks a portion was ploughed in December and January, and planted with wheat, skinless barley, and oats early in May. Another portion was ploughed in March, and after good rains. Part of this was planted with barley and peas on 15th July; while the rest of this area, together with land which was ploughed in June, was planted with oats on 16th July. The early-planted oats, wheat, and

barley on the early-ploughed areas all did well. The barley and peas on the March-ploughed land did fairly well; while the oats, which were planted over an area partly ploughed in March and partly in June, gave an indifferent crop on the March-ploughed area and no crops on the June-ploughed portion. These results, obtained inside the confines of one single paddock, are very significant. Undoubtedly the good yields obtained on a portion of the area were due to the early ploughing, which gave the land a few months' fallow, and thus the surface was open and loose for the ready intake of rain; but the results must be partly attributed to the early planting.

Thus, in this district, where dry springs are the normal condition, and where excessively dry times occasionally occur, there seems every indication that early ploughing and early planting for hay crops is good practice.

A word of caution is required to prevent disappointment. In exceptionally good years a system of fallow may prove slightly more expensive than late ploughings, and in normal years there may be nothing very pronounced in its favour; but in an exceptionally dry season, such as this, the advantage gained in one year will more than compensate for more than ten to twenty years of slightly varying results. It is the average of years that tells—not the speculation on a single season.

Lucerne.—Being faced with every indication of an excessively dry spring and shortage of grass and fodder, 50 acres of lucerne were cultivated with a spring-tooth harrow early in October. The object was to conserve as much soil moisture as possible, and thus get some growth on which to graze horses and sheep. The result was so successful that a lucerne renovator was procured (there are several good makes on the market), and another 100 acres of lucerne cultivated. In every case, the cultivated areas have shown a marked improvement in growth; and up to the present we have succeeded in keeping some forty young horses and 400 lambs in good condition and growing well. Had this cultivation been done in the late autumn instead of the early spring, the results should have been much better for two reasons:—

(1) In autumn one is familiar with the heavy dews that form. This dew is not moisture from the air which has condensed and fallen to the soil, but instead, it is part of the moisture which, rising from the warm soil into the cooler air, has condensed and fallen to the surface of the land. Dews, then, are an indication of the rate at which the soil is losing moisture, and cultivation will check this loss;

(2) With a loose surface, the soil will take in any rain that may fall more rapidly and more deeply.

Coupling these together, late autumn cultivation of lucerne should undoubtedly pay for itself in such times as these.

Pigs.—Prime pigs are selling at exceptionally high prices at present. Lately we marketed three pigs of average live weight of 170 lb., and

netted a return of £7 10s. each, or something over 10d. per lb. live weight. Certainly, these are abnormal prices; but even at half these rates pigs would pay.

Where lucerne can be so successfully grown as in the Lockyer Valley, pigs, if properly managed, should be amongst the surest and quickest sources of income.

With arrangements for the young pigs to graze on lucerne, or even to be fed with lucerne hay in racks, and finally fattened on home-grown maize, root crops, green barley, sweet potatoes, &c., pig-raising should be a very attractive enterprise. This is especially so as there is every indication that pork will remain up in price, while pig-raising offers one of the quickest ways of recovering from the effects of the present drought.

Water Conservation.—In this district probably the greatest problem is the supply of water for stock. Several wells that have been sunk have obtained water far too alkaline for stock use; and this seems to be a usual occurrence in the higher and more sandy portions of the valley. Furthermore, the upper reaches of the Lockyer Creek have ceased running. Consequently there seems only one course open, and that is the conservation of surface waters. The first step in this direction is a series of weirs on the Lockyer Creek, which would ensure a good supply of water for stock and possibly for irrigation.

Reporting on the Oat crops at the College, Mr. C. S. Clydesdale shows the following results:—

CALCUTTA OATS.

These oats were imported from F. H. Brunning, Melbourne, by the Department of Agriculture, and forwarded to the Queensland Agricultural College for trial.

The results have been remarkably good, considering the weather conditions under which they were grown.

The following gives the rainfall from the months they were sown until harvesting:—

	Points.
May	196
June	5
July	125
August	162
September	112
Total	600

This is the first time that these oats have been grown in this district, and have proved a success. Of course, this being the first year of trial, it does not imply that they are always going to be a success; but it is intended to save all seed and go on with further trials.

The land was prepared during the months of December and January, the area sown being 5 acres 3 roods.

The sowing commenced on the 11th May, 1915; planting 1½ bushels of seed per acre, using the ordinary seed drill.

The oats came through nicely and made excellent growth, stooling out well, growing to a height of 4 ft.; nice and fine in straw, with a large amount of flag; thus much resembling the Sixty-day Oat. It is apt to lodge a little, but nothing to prevent the use of the reaper and binder. There was little or no rust. Carter's Improved Tartarian oats, grown under identical conditions and alongside the Calcutta oats, were affected with rust.

These oats have proved the best with us this season, although we had some eleven varieties growing.

The oats were allowed to go to seed. Harvesting was commenced on the 29th September, giving a total yield of 11 tons, which works out at 1 ton 18 cwt. 1 qr. per acre.

They are not threshed out yet, but it is expected that there will be somewhere about 50 bags or 150 bushels.

VARIETY TRIALS.

Oats.

There were nine varieties of oats imported from New Zealand and Scotland, and experiments were carried out with these in 1½-acre plots. The following are the names:—New Zealand varieties: Twentieth Century, Golden Rein, American Banner, New Kerson, Great Mogul. Scotland varieties: Leader, Mounted Police, Beserkers, Prolific, Record.

The land was twice ploughed, twice harrowed, and three times disc cultivated, and was in excellent order. The sowing was commenced on 18th May, 1915; and 1½ bushels of seed per acre were sown with the ordinary seed drill. The land was rolled after sowing.

The following table will give fuller particulars:—

Name of Variety.	Area	Imported From.	Quantity of Seed per Acre.	When Sown.	When Up.	Coming in Ear.	When Harvested.	Field. Hay.	Field. Hay Saved for Feed.
	acre.							T. C. Q.	C. A.
Twentieth Century	1	New Zealand	1½ B	18-5-15	27-5-15	4-10-15	21-10-15	1 0 0	6 0
Golden Rein ...	1	New Zealand	1½ B	18-5-15	27-5-15	4-10-15	21-10-15	1 17 0	...
American Banner	1	New Zealand	1½ B	18-5-15	27-5-15	2-10-15	21-10-15	1 9 0	...
New Kerson ...	1	New Zealand	1½ B	19-5-15	27-5-15	7-9-15	9-10-15	1 4 0	5 0
*Great Mogul ...	1	New Zealand	1½ B	19-5-15	27-5-15	...	...	5 0 0	...
*Leader	½	Scotland ...	1½ B	19-5-15	27-5-15	...	...	1 17 2	...
Mounted Police ...	½	Scotland ...	1½ B	19-5-15	27-5-15	21-10-15	11-10-15	0 15 0	...
Beserker's Prolific	½	Scotland ...	1½ B	19-5-15	27-5-15	21-10-15	11-10-15	0 17 0	...
Record	½	Scotland ...	1½ B	19-5-15	27-5-15	21-10-15	11-10-15	1 3 0	...

* Green feed.

The weights shown in the above table are not from areas as given. An experiment of feeding down the varieties was tried.

On 20th July the whole area was divided in halves by sheep hurdles, and the sheep turned in and allowed to graze. This portion of the plots proved a failure, only growing about 6 in., and then coming into ear; so it can be reckoned as half-acre in place of acre-plots, and quarter-acre in place of half-acre plots.

These oats did fairly well considering the weather conditions, but were very coarse, and had suffered considerably from the ravages of rust, smut, and caterpillars. All varieties had a large amount of flag, and in some instances were apt to lodge. Having only small quantities of the original seed, it was found necessary to save a small portion of two varieties for further trials.

The best of all of these varieties was New Kerson, which was the earliest, and was not so coarse in the straw.

BY-PRODUCTS OF A COTTON CROP.

Owing to the want of experience as to the value of the by-products of a cotton crop, ginners, in the halcyon days of cotton-growing in Queensland, threw away thousands of pounds sterling annually. Cotton seed, after passing through the gins, carries a certain amount of short fibre which is not removed by either the saw or roller-gin, and was looked upon as valueless. The American cotton-ginners, on the other hand, very soon discovered that there was money in this so-called refuse, which goes by the name of " linters "; and they invented a special gin with which to recover it. This gin has two saws closely set which take off the smallest fibres adhering to the seed, thus recovering from 46 to 72 lb. of fibre per ton of seed, which readily sells at £3 per ton. During the process, these linters pass into a condenser, and then through rollers on to a steel core, which revolves slowly and winds off the lint in the form of a compressed bat, about 1 in. in thickness, forming it into a cylindrical roll, when it is ready for market.

A well-grown crop of Uplands cotton will, in a fair season, return from 1,000 to 2,000 lb. of seed cotton per acre, and 1,000 lb. of this contains about 600 lb. of seed. Thus, roughly, 100 tons would give about 53 tons of seed, the linters from which would amount to 2,650 lb., or, approximately, 1 ton 4 cwt., which, at £3 per ton, would be worth £3 12s. Now, as to the other by-products. The re-ginned seed is run through machines which separate the hulls from the kernels. One ton of kernels will yield near half-a-ton of hulls worth 12s. 6d. per 600 lb. of seed. Next, we have the oil. The kernels, after being hulled, yield 30 per cent. of their weight in the shape of oil. The 300 lb. of kernels, which constitute one-half of the weight of the seed, yield 12 gallons of oil, or about 90 lb., worth 20s. per cwt. in its crude state, or about 16s. for the 12 gallons. And there is yet another by-product of value—the oil-cake, which represents 210 lb. At the low price of £5 per ton, these 210 lb. are worth nearly 10s. (Since the war, prices for these products are much higher.)

The hulls, mixed with cotton-seed meal, form a superior food for stock for which there is a steady demand for the whole supply. In

the United States of America the value of the cotton-seed oil amounts to nearly £4,000,000, and of the cake to £2,500,000 annually; and Queensland ginneries thus threw away during the progress of the American civil war, something like £120,000, the value of the by-products of 26,000,000 lb. of cotton lint which alone brought £1,300,000 in the Liverpool markets.

MARKET GARDENING.

PRODUCE OF A SMALL VEGETABLE GARDEN.

As showing what can be done in the way of raising vegetables on a small suburban allotment, given a fair supply of manure, a compost heap, and a good water supply, we have received the following particulars from a resident of the suburb of Milton. The soil (he states) is very gravelly and overlies stiff red clay, and has been under cultivation for over fifteen years.

Between 5th September and 6th November (about nine weeks), the following quantities of vegetables were obtained (Jerusalem artichokes from the previous season left over until October) :—

Cauliflowers, 2 dozen; cabbages, 3 dozen; parsnips, 24 bunches; carrots, 26 bunches; turnips, 10 bunches; lettuce, 3 dozen; beetroots, 15 bunches; mustard and cress, 20 bunches; parsley and mint, 6 bunches; tomatoes, 10 lb.; Jerusalem artichokes, 20 lb.; broad beans (a failure), 2 lb.

Fruit.—Papaws, 126; peaches, 30 dozen; grapes (1914), 110 lb.; coffee, 10 lb. (parchment, which was roasted and ground at a Brisbane establishment); apples, Rome Beauty, 3 dozen; passion fruit (now ripening); papaws coming on but being attacked by flying foxes; coffee, ripe; apples, a fair crop set; grapes, a good crop well advanced.

The whole of the garden has been again well dug and manured, and crops of cucumbers, squashes, Lima and Kentucky Wonder beans, tomatoes, carrots, parsnips, Jerusalem artichokes, sown, some of which were in flower in November.

The garden contains about 2¼ perches, not including the space allotted to fruit-growing. The owner reckons he saves more than 1s. a day by growing his own vegetables, instead of buying them. The labour is done entirely by himself before and after business hours.

ECONOMY IN FOOD.

The Journal of the Board of Agriculture, London, gives the following sensible advice, which dwellers in even cities in Queensland can carry out without much trouble. With a town supply of water, much money can be saved by growing vegetables and keeping fowls. We, ourselves, have kept up a supply of vegetables during the present dry time and high prices for vegetables, for the past five months, and the supply still continues. The Board of Agriculture makes an appeal to country people and to town dwellers who have a bit of garden ground. It says:—

"*Everyone*, who lives in the country and has a garden, can produce *something* to eat—the more the better: vegetables, fruit, poultry, eggs, milk, cheese. Plant at once what you can, and prepare in all possible ways for next year's cropping! Every plant in your garden may save you money! Produce all you can; buy as little as possible! Cultivate thoroughly! Destroy insect pests and weeds! Prepare manure! Preserve and store your crops with the greatest care! The finest harvesting may be rendered useless by bad storing. Protect from the weather! Destroy vermin! Store your own vegetables! Bottle your fruit or make jam or pulp of it! Preserve your eggs when abundant! Cure your own bacon! Eat little meat! Replace meat by milk, cheese, peas, beans, and lentils, which are as rich in flesh-formers as meat, and much cheaper. Use more vegetables! Eat more fruit! Bake your own bread: it will be cheaper and better! Use whole-meal flour from home-grown wheat, barley, and oats. Good, wholesome bread can be made from:—(1) Household flour, or whole-meal flour; (2) $\frac{1}{2}$ household flour and $\frac{1}{2}$ barley-meal; (3) $\frac{7}{8}$ whole-meal flour and $\frac{1}{8}$ fine oatmeal; (4) $\frac{4}{5}$ whole-meal flour and $\frac{1}{5}$ maize meal; (5) $\frac{3}{4}$ household flour and $\frac{1}{4}$ boiled potatoes; (6) oatmeal; (7) barley meal. Cook vegetables by steaming! Boiling in water reduces their food value! Cook potatoes in their skins! Waste nothing! Buy nothing from abroad that can be produced at home!"

"Next year's cropping" does not affect the Queensland market gardener. With a plentiful supply of water and manure, there is not a month in the year during which vegetables of some description cannot be grown.

The following list of vegetables which may be planted each month, where climatic conditions are favourable, will show what may be done even on a 16-perch allotment:—

January.—French beans, brocoli, cabbage, carrots, celery, cress, lettuce, endive, peas, parsnips, radish, turnips.

February.—About the same crops, and potatoes.

March.—Onions, cabbages, potatoes, beans, beet, &c.

April.—Same as previous month.

May.—Transplant onions, cabbages, and rhubarb.

June.—Rhubarb, strawberries, cabbage, cauliflower, lettuce, peas, watercress.

July.—Asparagus, cauliflower, carrots, spinach, beans, onions, &c.

August.—Peas, beet, cucumber, tomatoes, Jerusalem artichokes, pumpkins, cabbage, cauliflower, parsnip, radish, carrot, potatoes, maize.

September.—French and English beans, Lima beans, beet, parsley, lettuce, egg plant, cucumbers, melons, pumpkins, vegetable marrows, squashes, carrots, parsnips, tomatoes.

October.—It is not advisable to sow cabbage this month, owing to trouble with the fly; but all the above and rosella seed may be planted.

November.—French beans, melons, brocoli, cress, cucumbers, lettuce, rosella, pumpkins, &c.

December.—The same as for January.

Pastoral.

DESTRUCTION OF PRICKLY-PEAR BY THE COCHINEAL INSECT.

The Under Secretary for Lands (Mr. G. Graham), when discussing the prickly-pear question last month, said:—"The cochineal insect is doing such wonderful work in the destruction of prickly-pear that people in the Charters Towers district are fearing that it will kill all the pear and leave them without any to burn and feed their stock with while the dry weather remains."

The cochineal insect was brought from Colombo, Ceylon, on the Orvieto in February, 1913, by the Prickly-pear Travelling Commission, and was placed on a bad patch of pear at Sandy Creek, in the vicinity of Charters Towers. The insect has done really wonderful work in the eradication of the pest, and the success realised has been beyond all expectations.

Mr. Graham has issued instructions to the Land Commissioner at Charters Towers to put up notices that any persons destroying the cochineal insect on pear on Crown land will be prosecuted.

The "Tropical Agriculturist," Ceylon, writing on this subject in that Journal in September, 1915, recalls that, in January, 1913, Dr. T. H. Johnston, Lecturer in Biology at the University of Queensland, and Mr. Henry Tryon, Government Entomologist and Vegetable Pathologist of Queensland, visited Peradeniya to inquire into means used to destroy the prickly-pear. They discovered at Matara the Ceylon Wild Cochineal Insect (*Coccus indicus*) feeding on some Prickly-pear (*Opuntia monocantha*), which the inhabitants stated used to exist in great quantity, but for some reason which they could not explain was disappearing. They procured specimens of the plant and parasite, and a little breeding farm was established at Henaratgoda. At the same time, the Northern Province Prickly-pear (*Opuntia dillenii*) was also planted. The insects established themselves on *Opuntia monocantha,* and two boxes of plants carrying a quantity of the scale were despatched to Brisbane early in 1914. At the time of writing the little patch of *Opuntia monocantha* has been almost exterminated by the parasite, but all efforts to establish it on *Opuntia dillenii* have proved unavailing.—"Annual Report of the Director of Agriculture, Ceylon, 1914."

CARAWAY SEEDS.

The seed should be sown in the autumn in drills 1 ft. apart. The plants, when strong enough, are to be thinned out to 8 in. apart in the rows. The land will require an occasional hoeing and cultivation to ensure a satisfactory crop, which will be produced in the following summer. The seed may be obtained from Messrs. E. and H. Hackett, Rundle street, Adelaide. It is usually sold at 6d. and 1s. per packet.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FOR MONTH OF OCTOBER, 1915.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Miss Melba	Holstein	30 Sept., 1915	1,035	3·5	42·30	
Sweet Meadows	Jersey	28 Sept. ,,	578	5·4	36·89	
Miss Edition	,, ...	27 Sept. ,,	774	4·0	36·34	
Gretchen ...	Holstein	16 Aug. ,,	968	3·0	33·79	
Miss Lark ...	Ayrshire	8 Sept. ,,	738	3·5	30·21	
Iron Plate ...	Jersey	21 Feb. ,,	468	5·4	29·88	
Mischief ...	Ayrshire	27 Sept. ,,	798	3·2	29·78	
Rosebud II.	,, ...	11 Oct. ,,	671	3·7	29·08	
Windyhill Davidina	,, ...	21 Aug. ,,	649	3·3	28·86	
Bluebell ...	Jersey	20 June ,,	574	4·2	28·83	
Sylvia ...	Shorthorn ...	25 Aug. ,,	666	3·6	28·08	
Lady Margaret	Ayrshire	14 Oct. ,,	594	4·0	27·89	
Noble Dot ...	Jersey	2 May ,,	478	4·9	27·62	
Lady Twylish	,, ...	5 June ,,	494	4·7	26·02	
Lennie ...	Ayrshire	23 July ,,	654	3·4	25·97	
Lady Dorset	,, ...	10 Aug. ,,	567	3·4	22·52	
Lady May ...	,, ...	7 Mar. ,,	497	3·8	22·13	
Pauline ...	Shorthorn... ...	17 Sept. ,,	620	3·0	21·64	
Laurette ...	Ayrshire	9 Oct. ,,	582	3·2	21·62	
Netherton Belle	,, ...	23 April ,,	433	4·2	21·37	
Miss Belle ...	Jersey	2 July ,,	368	4·9	21·26	
Lilia ...	Ayrshire	19 Aug. ,,	606	3·0	21·15	
Nellie II. ...	Shorthorn... ..	20 July, 1914	510	3·4	20·26	

From 1st to 20th October the cows received a ration of 35 lb. panicum ensilage daily, in addition to natural pasture; from 21st to 31st October they grazed on lucerne and wheat paddocks.

ADVICE TO PIG-BREEDERS.

The Department of Agriculture and Technical Instruction for Ireland consider that the following opinions expressed by the Committee on the Irish Pig Breeding Industry cannot be too widely known:—

1. The numbers of pigs in countries which export bacon to Great Britain are falling off, and it may be anticipated that, in consequence, exports of bacon will shrink, and that Irish bacon will be in great demand. The number of pigs in Ireland should, therefore, be increased.

2. It is not necessary to cook meals for pigs. Steep the meals in cold water and feed raw; just as good results will be obtained, and labour and fuel will be saved.

3. About 5 cwt. meal will produce 1 cwt. pork.

   Given in conjunction with other foods—About 4 lb. potatoes equal 1 lb. meal in feeding value; about 6 lb. separated milk equal 1 lb. meal in feeding value.

   Separated milk given with meal and potatoes is now worth 2d. per gallon.

4. Farmers should breed the pigs they fatten, and thus secure the profit of both breeder and feeder.

5. More home-grown foods should be procured for feeding to pigs. Barley, oats, and potatoes are most suitable.

The Department learn that some farmers have used cod-liver oil in the food for pigs. This is a most undesirable practice, as the oil imparts an objectionable, fishy flavour to the pork.

"OVERRUN" IN BUTTER-MAKING.

The term "overrun," which is so puzzling to many of our dairy farmers, is thus explained by "Hoard's Dairyman":—Butter is composed of fat, water, salt, casein, a little milk sugar, and ash. The supplier is paid for his milk or cream according to its fat test; but since water, salt, casein, milk sugar, and ash are added to it, more pounds of butter are made than there are pounds of fat received from the farmer. The difference between the fat deliverd to the creamery and the butter made constitutes the overrun, which amounts to 18 per cent. with whole milk and 20 per cent. with cream. In other words, this overrun is made up of water, salt, casein, milk sugar, and ash. In average butter there are about 83 lb. of fat in 100 lb. of butter; in other words, 17 lb. constitute the overrun. Of course an allowance is made for this in the O'Callaghan chart on which most of our factories work.

THE EFFECT OF CANE-TOP FODDER ON THE CONSISTENCY OF BUTTER.

As a result of feeding sugar-cane tops to dairy cattle in Barbados. the statement is definitely made by at least one dairyman, that the consistency of the butter produced is adversely affected as soon as the cows are fed on cane tops.

Cane tops are the most readily available green fodder on certain estates for a considerable part of the year, and would seem to be a food eminently suited to the production of milk and butter. It is found, however, that a diet of sugar-cane tops results in the production of a soft butter without grain. This is an undesirable quality, and, in addition, such butter is more difficult to work and to free from the butter-milk.

It would be interesting and useful to have the results of experience in other tropical localities with regard to the feeding of sugar-cane tops to dairy cattle.—"Agricultural News," Barbados.

The Horse.

SKIN DISEASES OF HORSES.

"Veterinarius" writes on the subject in the "Live Stock Journal," London:—

The prevalence of skin diseases of a parasitic nature can be accounted for by the greater movements of horses during the year of war than at any previous period in our history, not excepting the time when so many thousands of horses were exported to South Africa. Then we drew upon almost every country with horses to spare, and large numbers were purchased from our present enemies, the Hungarians. For many years past it has been all a part of the German bluff to make us believe that veterinary science and sanitary science and police had been so well developed and in advance of ourselves that infectious diseases were better managed and almost non-existent in the German Empire. and that the means of diagnosis and the successful treatment were in that region of the world so much better understood that we could alone be successful by copying their methods *and purchasing their products.* The journals devoted to pharmacy in this country and the interests of pharmacists had begun, nay even dared, to utter their suspicions that all was not well with us in buying German proprietary articles when we might have produced at much less cost curative substances of equal or greater value. The thoroughness of the plan was as great as that by which the bottle and other trades were captured from us—but that is another story.

Skin diseases on the Continent of Europe, like swine fever and other infectious maladies, have always been more prevalent and less under control than in these Islands, and yet—and yet—our own professors and teachers bowed the knee in reverence to things German and forsook the well-tried home products for the hybrid and synthetically produced foreign proprietary articles protected by their names and trade-marks, and "made in Germany" was a recommendation when it should have been a warning.

Mange was prevalent in the early months of the year, both psoroptic and symbiotic, while the more virulent type, known as sarcoptic, was by no means rare. Seasonal influences are great, just as in one year flights of ladybirds afford much pleasure to children and the next year hardly any are to be seen. If the ordinary rules of reproduction applied to parasites, there would be an increased number in the year following a prolific one, but such is not the case. Some at present unknown factor militates against the further propagation of an infectious disease just at a time when it seems to have developed an invincibility. If this were not so, then the world's inhabitants would be destroyed by parasites. It is perhaps not generally known that the less virulent types of mange never die out in the stables and byres of those farmers who leave everything to the "Nature cure," which is such an easy way of avoiding trouble and expense for the time, but usually has to be paid for dearly at some future period. The stalled ox and the poor cow during winter—

the late months more especially—develop wrinkles on the neck and baldness about the root of the tail as the result of symbiotic mange mites. This trouble is accepted as a matter of course, because it is quite usual with a certain class of owner, and they would be surprised if told that the trouble was caused by mites, and could be prevented or cured at the beginning of the winter by cheap and efficient dressings.

Another example of mange which is localised and not suspected is that which causes horses of the Shire type to spoil their feather by rubbing one leg over the other. A symbiot is at work, causing an irritation for his own profit. He is not a borer, who can pierce the skin for the nutriment he requires, and is for the most part quiescent when the horse is out of doors, but at night, or when the farm horses are standing in the stall, he combines with his fellows in a march across country, so to speak, and this trampling of myriad little feet causes itching. The host stamps and rubs; the abrasions caused by the shoe or opposite hoof give off serum or a fluid of the kind upon which these parasites feed. Thus they accomplish their object at the expense of their host without any special effort of their own. Their presence, as in the cattle form previously mentioned, is not so much as suspected by the farmer, who generally thinks a horse is disposed to have grease if he stamps and rubs in the stable at night. He does not know that this annoying, sleep-disturbing, and disfiguring malady can be easily cured, but he purchases grease-balls, and gives nitre and sulphur or other remedies to act upon the kidneys, which have nothing to do with the trouble.

The diagnosis is not difficult, and if the owner is in doubt he will not do wrong in following the directions given below.

Plaster thickly with soft soap the whole of the affected area and some few inches beyond it. Leave the soap on all night, and in the morning wash the parts with plenty of warm water. *Warm* we have said advisedly, and we do not mean *hot* water. for it has yet to be generally known that the thick skin of the bullock and the horse is more easily scalded than the thin skin of the cook or the insensitive hand of the manual labourer. The soap does not kill the mites. It prepares the way. It causes the outer layer of the skin to swell up and become loosened, so that the parasiticide or killer to follow comes into contact with all that would otherwise lurk in security and in sufficient numbers to reproduce and repopulate the affected region. There is a wide choice of destroyers, and most of the popular disinfectants of 5 per cent. strength prove effective. All the coal tar series can be relied on, and there is no objection to their employment, save that a certain amount of resin is present, and this inclines to mat the feather on a Shire. For such we may use a similar strength of chloride of zinc in water or tobacco juice which can be purchased of horticultural supply merchants. It does not pay duty, and is cheap. If only a small quantity is needed, we may use 1 oz. of common shag tobacco to the pint of water, or if very fully convinced of the importance of national economy the heel taps from our pipes may be infused in boiling water.

[The above is corroborated by Mr. McGown, Veterinary Surgeon to the Department of Agriculture and Stock, Queensland.—Ed. "Q.A.J."]

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1915.

Seven thousand six hundred and thirty eggs were laid during the month, an average of nearly 144 per pen. This is a fine performance, but, if the present hot dry weather continues, the laying is sure to fall off, as our green feed is just about finished. C. E. Bertelsmeier's White Leghorns win the monthly prize with 164 eggs. The following are the individual records:—

Competitors.	Breed.	Oct.	Total.
Jas. McKay	White Leghorns	130	908
C. E. Bertelsmeier, S.A.	Do.	164	900
J. Gosley	Do.	142	886
Mrs. Munro	Do.	144	884
Mrs. J. Jobling, N.S.W.	Black Orpingtons	114	878
J. D. Nicholson, N.S.W.	White Leghorns	148	868
A. W. Bailey	Do.	151	863
J. M. Manson	Black Orpingtons	146	861
Kelvin Poultry Farm	White Leghorns	152	860
A. H. Padman, S.A.	Do.	159	855
S. E. Sharpe	Do.	138	853
J. R. Wilson	Do.	153	853
E. F. Dennis	Do.	155	853
King and Watson, N.S.W.	Do.	148	838
J. M. Manson	Do.	159	822
A. T. Coomber	Do.	150	814
O.K. Poultry Farm	Do.	160	814
C. T. Clark	Do.	138	809
T. Fanning	Black Orpingtons	140	808
E. A. Smith	White Leghorns	154	801
H. Hammill, N.S.W.	Do.	139	800
E. Le Breton	Do.	131	798
E. V. Bennett, S.A.	Do.	146	795
C. Knoblauch	Do.	147	794
W. Parker	Do.	156	789
W. Purvis, S.A.	Do.	151	788
R. Burns	Black Orpingtons	144	786
T. Fanning	White Leghorns	143	783
F. Clayton, N.S.W.	Do.	149	777
Cowan Bros., N.S.W.	Do.	151	773
R. Jobling, N.S.W.	Do.	146	772
W. Meneely	Black Orpingtons	133	766
R. Burns	S. L. Wyandottes	140	757
Moritz Bros., S.A.	White Leghorns	143	757
Geo. Tomlinson	Do.	125	757
Cowan Bros., N.S.W.	Black Orpingtons	144	755
W. Lindus, N.S.W.	White Leghorns	148	752
Derrylin Poultry Farm	Do.	145	752
E. A. Smith	Black Orpingtons	157	742
Wm. Lyell	White Leghorns	139	739
R. Jobling, N.S.W.	S. L. Wyandottes	120	736

Competitors.	Breed.	Oct.	Total.
J. Zahl	White Leghorns (No. 1)	151	723
G. H. Turner	Do.	137	711
J. H. Gill, Victoria	Do.	160	709
J. G. Richter	Do.	146	709
J. Aitchison	Do.	137	706
J. Zahl	Do. (No. 2)	127	683
Loloma Poultry Farm, N.S.W. ...	Rhode Island Reds ...	145	685
E. Pocock	White Leghorns ...	144	668
F. Clayton, N.S.W.	Rhode Island Reds ...	143	604
S. Chapman	Brown Leghorns ...	132	590
W. H. Forsyth, N.S.W.	White Leghorns ...	145	579
J. R. Johnstone	Plymouth Rocks ...	121	438
Totals	...	7,630	41,001

State Farms.

STATE FARM, BUNGEWORGORAI.

The Manager reports for the month of October that dry conditions have prevailed, only 16 points of rain having been recorded, making a total of 520 points for 1915.

The temperature recorded averaged 89·9 degrees Fahr.

As regards the wheat crops, these were very light, but it was hoped that sufficient seed for next season's operations would be obtained. Only the light soils yielded any return. Teff.grass proved its ability to survive under conditions fatal to most crops in the early stages of growth. The grape crop was fairly promising, but citrus trees suffered much from the drought. Cattle and horses were in fairly good condition, but the old mares were not likely to survive unless rain were to fall early in November.

THE LARGEST CHEESE EVER MADE.

Some very large cheeses have been occasionally made in Australia; but our cheesemakers have never produced one which came within tons of one made in Lawrence County, New York, which was sent to the Panama Exposition at San Francisco, the weight of which was given at 6 tons. A cheese was made in September, 1892, at Perth, Ontario, Canada, which weighed 22,000 lb. net, or, in other words, 11 tons. This cheese was exhibited at the Chicago Fair in 1893. It required the milk from twelve factories for more than two days to make the Canadian cheese. The total quantity of milk used was 207,200 lb. Thus the Canadian Jumbo holds the record.

The Orchard.

FROST PREVENTION.

We have, for several years, pointed out to orchardists and others that the damage done by early and late frosts to blossoming fruit trees, vines, sugar-cane, &c., can be mitigated or even entirely prevented by very simple means. Owing to the comparatively inexpensive character of the material used in damp, smudge fires, these seem the best adapted for common use in orchards, vineyards, and gardens. Low-growing plants, such as pineapples, can be protected with but little expense by coverings of straw and other light materials. It seems that there is an idea that in October all danger from frost is over, but those who remember the 2nd, 3rd, and 4th days of October, 1899, know that such is not the case. In that year sharp frosts swooped over a large portion of the State. Never, in the history of wheat-growing in Queensland, has such a calamity occurred in October as the destructive frost of 1899. Far and wide on the Darling Downs, vast stretches of country were waving with billowy crops of wheat and barley just burst into ear. Suddenly, when all were rejoicing in the splendid harvest prospects, the calamitous frosts occurred, and it was found that nearly the whole of the crops on the lowlands were hopelessly ruined, and the disaster was further intensified in some districts by a hailstorm which destroyed what the frosts had spared. We believe that the frosts extended to the Central districts, and did much damage to the canefields.

Meteorological science is to-day so far advanced as to enable scientists to foretell a frost from twenty-four to to forty-eight hours in advance. This is an important point gained, and a warning of such a length enables one to make some preparations for saving at least a portion of a crop.

The fruitgrowers of Stanthorpe might, had a warning been received last October, have been saved much of the loss occasioned by the frost.

The most effective preventive is thick smoke, and this can be produced in several ways. One is by making heaps of wood, weeds, old cornstalks, or rotten straw. These should be lighted in the early morning, say, about 4 a.m.; and very shortly the fields will be covered by an artificial cloud, hanging like a curtain a little height above the soil. It should be borne in mind that if, in the winter, one thermometer is placed close to the ground, and another at a height, say, of 4 or 5 ft. above it, the temperature during a clear frosty night is from 10 to 12 degrees lower close to the ground. The smoke will be perfectly sufficient to prevent any damage by frost, provided the temperature on the ground does not fall lower than 6 degrees of frost—that is, to 26 degrees Fahr.

This protection is largely employed in America, France, New Zealand, and other countries. On this subject, a contemporary writes:—"With large supplies of crude oil available, Americans burn same in smudge pots on nights when the temperature falls to about 35 degrees,

and if the temperature falls lower more fires are lit, and consequently the temperature is raised considerably above the danger point. In New Zealand districts liable to frosts, the growers cut benzine tins in half and use them as receptacles for burning coal. Already these methods have saved thousands of pounds to growers, as the temperature can be actually raised fully 10 degrees to 12 degrees on frosty nights. One disastrous frost can wipe out the fruitgrower's expected harvest and nullify the laborious work of a year. The cost of installing these preventive measures is very slight, but it is an insurance against total or partial loss. It must be distinctly understood that it is necessary to make more than a big smoke on nights when the frost is serious. The temperature must be actually raised above freezing point (32 degrees Fahr.); in fact, it is an advantage to raise the temperature to above 35 degrees."

We shall revert to this important matter of frost prevention at a future date, when fruitgrowers at Stanthorpe, and in other districts liable to frost, may think it worth while to take a little trouble to save their crops.

THE COLD-WATER CURE FOR WOOLLY APHIS.

That hosing with plain cold water will keep woolly aphis in check, if done frequently and forcibly enough, is contended by a writer (Coleman Phillips) in the "Canterbury Times." It is a practicable idea for the owners of suburban gardens, although it may not commend itself to commercial orchardists; and it at least has the merit of being absolutely harmless to the trees. The writer also has a good deal to say about the injurious effects of poisonous sprays, and the desirability of encouraging the natural enemies of the different insect pests, some of which is debatable matter. But in regard to the cold-water cure he says:—

"My orchard of about 1,000 trees surrounds the house, and I found lately that two lengths of garden hose (50 ft. each) from the high-pressure water taps would command most of the trees. I had tried everything against the woolly aphis (kerosene and red oil emulsions, hand painting, &c.—all the oil remedies, in fact), and failed. I have not been successful with kerosene emulsion making; sometimes it goes well, sometimes badly, and I think this is the general experience; but it is a very useful remedy to have ready at hand.

"In spite of all I did the trees were becoming worse, so I resolved upon hosing the apples with plain cold water. The effect was simply marvellous. The trees remained clean for three weeks to a month, when I gave them another hosing. I hose four times in summer (in December, January, February, and March), as it is in these months the aphides increase. But the plan is to hose whenever the pest shows itself at all badly, even once a week. Two boys get over the orchard in a couple of days, one hosing, the other searching out ahead, and also going over the trees that have been hosed to discover missed spots.

"I try to hose just before the arsenate spray for Codlin moth; not that I believe in the arsenate at all, as I will show directly, but I am compelled by law to do it. After hosing a tree, churn up the soil beneath it with water for a little while to bury any of the aphides that are washed off. The hosing gives the trees a drink when they badly want one; it does not kill any natural enemy, which, unfortunately for us, all are conspicuous now by their absence, and it washes off a lot of other germs hostile to the health of the tree. The strong jst of water cleans out spiders, earwigs, aphides, &c., which congregate near the fruit buds, and the whole tree looks as clean as a new pin. These harmful aphides give in to nothing but force. And most of our spraying pumps are of little use. An oil-engine force or motor pump, costing anything over £100, is too expensive for small orchardists, but these pumps would give an orchard a wash down once a fortnight quite well and easily. It is this plain washdown I recommend, no matter how it is done, as the rain has not force enough to dislodge the woolly aphis.

"I do not say that the hosing washes all the aphides out of the crevices, because no force will do that. Only the searching little feelers and mouths of the natural enemy will get into these crevices, wherein lies their enormous use in upholding nature's balance. What I do affirm is that the hosing so keeps down the woolly aphis (and also washes off other harmful pests) that the evil is under control, and the next season's fruit buds are not injured. I do not say that we can entirely do without arsenate, Bordeaux, and red oils just yet; but I suggest that we should turn our attention to gradually dispensing with these poisons by breeding and turning out the natural enemy all over the Dominion, and then hosing our trees with plain cold water."

CONTROLLING THE WOOLLY APHIS.

Under the supervision of a special commission, M. Celestin Duval carried out on 19th August, 1913, at Boulonge-sur-Seine, experiments in controlling Woolly Aphis (*Shizoneura linigera*). He used for the purpose a liquid insecticide prepared by himself, the composition of which he kept secret. An apple-tree covered with colonies of this aphis was sprayed with the insecticide; after about an hour all the insects reached by the liquid were dead, while no signs of scorching were observable on the leaves. On other trees treated in the same way, eight or ten days previously, there were no living aphids to be seen, nothing remaining but traces of the insects reduced to ashes. It thus seemed, in the opinion of the commission, that the method was efficacious and practicable. Being free from all necessity for reserve, M. Duval made known in 1914 the composition of his insecticide. According to the prescription of the inventor, the following solution must be used in case of leaves, young shoots, or wood of several seasons, during the growing seasons—Formula I.: Rain water, 10 gallons; carbonate of potash, 6½ oz.; sulphoricinate of soda, 4 lb.; methylated spirit, 2 lb.; strong extract of tobacco (10 per cent.), 1 lb. The spray gradually dissolves the waxy

coating of the aphids, so that finally all of them (females and young) are turned into a sort of dense paste, which soon dries up and becomes of a greyish colour. During the last two or three weeks of the vegetative period, when the leaves are about to fall naturally, and there is no fear of harming them, the following

STRONG SOLUTION

is used if there are still any aphids:—Formula II.: Rain water, 10 gallons; potash from ashes, 1 lb. or 19 oz.; sulphoricinate of soda, 4 lb.; strong tobacco extract, 2 lb.; methylated spirit, 2 lb. Although the insects are at this time encased in a thicker and less permeable wax envelope, they cannot resist the action of this mixture. The time comes when the sexual and fertilised females lay their winter eggs. In order to destroy the latter, all the holes, crevices, and cavaties of the cortex are painted over with the following composition:—Formula III.: Rain water, 10 gallons; soft soap, 35 lb.; sulphoricinate of soda, 5 lb. Finally, to destroy the aphids in their last refuge, which is the roots on which the sexual females assemble after having laid their eggs, a kind of basin is excavated round the foot of the tree so as to expose the roots on which the insects have gathered; then they are

WELL WATERED

with the solution of Formula I., or, if necessary, Formula II. As soon as they are seen to be dead the basin is filled in. M. Duval believes that if these different prescriptions are followed woolly aphis will disappear from the trees of a plantation.—"Monthly Bulletin of the International Institute of Agricultural Intelligence."

GRAFTING: REMOVAL OF BINDING.

A number of trees of various kinds have been grafted by officials of the Department in different villages. It is obviously impossible for them to return again to each village merely in order to remove the binding, and this must be left to the tree-owners themselves. The latter are invariably instructed on this point; but yet again and again the matter is neglected, and one frequently sees trees which have been sadly disfigured in consequence of the bandage having been left on too long. The bandage should be removed not later than 15 or, at most, 20 days after grafting. If left on beyond that time, the circulation of sap is interfered with, and whereas the new graft will develop and swell out above the head of the stock, that portion of it which remains under the binding will be undeveloped, and at the grafting point the graft will become so weak that it will be liable to be broken by any light wind.

The success of the binding operation is shown by the bud swelling, and then the head of the stock must be cut off to about 4—6 in. above

the union, so as to enable us to fasten to it the first season's growth and prevent it from being blown off. The remaining 4—6 in. of the stock's head should be furnished with leaves. Should there be no leaves, the stock should be cut off at a higher point, as the leaves are indispensable for the circulation of sap and for the success of the grafts. The remaining head of the stock must be cut just above the graft the following season.—"Cyprus Journal."

FRUIT TREE AND GRAPE VINE PRUNING.

We have received from the author, Mr. George Quinn, Horticultural Instructor to the Department of Agriculture, South Australia, a copy of his "Handbook for Fruit and Vine Growers," just published. In arranging the order of the subject matter, Mr. Quinn says that the sequence given is "that which a good many years of close and varied observation have led me to believe to be that which will be found the most conducive to obtaining a good grounding in the essentials of this fascinating subject." From beginning to end—from the basic principles of pruning to the framing of the tree, and to the renovation of old trees, to summer and winter pruning—the entire book places clearly before the fruit-tree grower and the vigneron the successive operations to be carried out for the formation of a successful orchard or vineyard. The instructions for the work and the reasons for it are given so clearly and in such simple language devoid of all unnecessary scientific verbiage, which in some treatises on orchard work serve only to confuse the non-scientific orchardist, that any reasonably intelligent man can follow and act upon them with little difficulty. The book, which covers 277 pages, and is most profusely illustrated with exceptionally good photographs, should prove of the greatest value to all engaged in fruit-growing, whether professionally or as amateurs. Mr. Quinn has by his work done a great service to them all.

BANANA CULTURE.

The Director of Fruit Culture (Mr. A. H. Benson) does not recommend the planting of maize between the rows of bananas. The only crops which should be so planted are crops for green manuring, which will tend to increase the organic matter in the soil as well as supply nitrogen for the use of the banana plants. Bananas are gross feeders, and the growing of any crop such as corn between the rows would be apt to deplete the soil of the plant foods which are required for the production of first-class bunches of bananas.

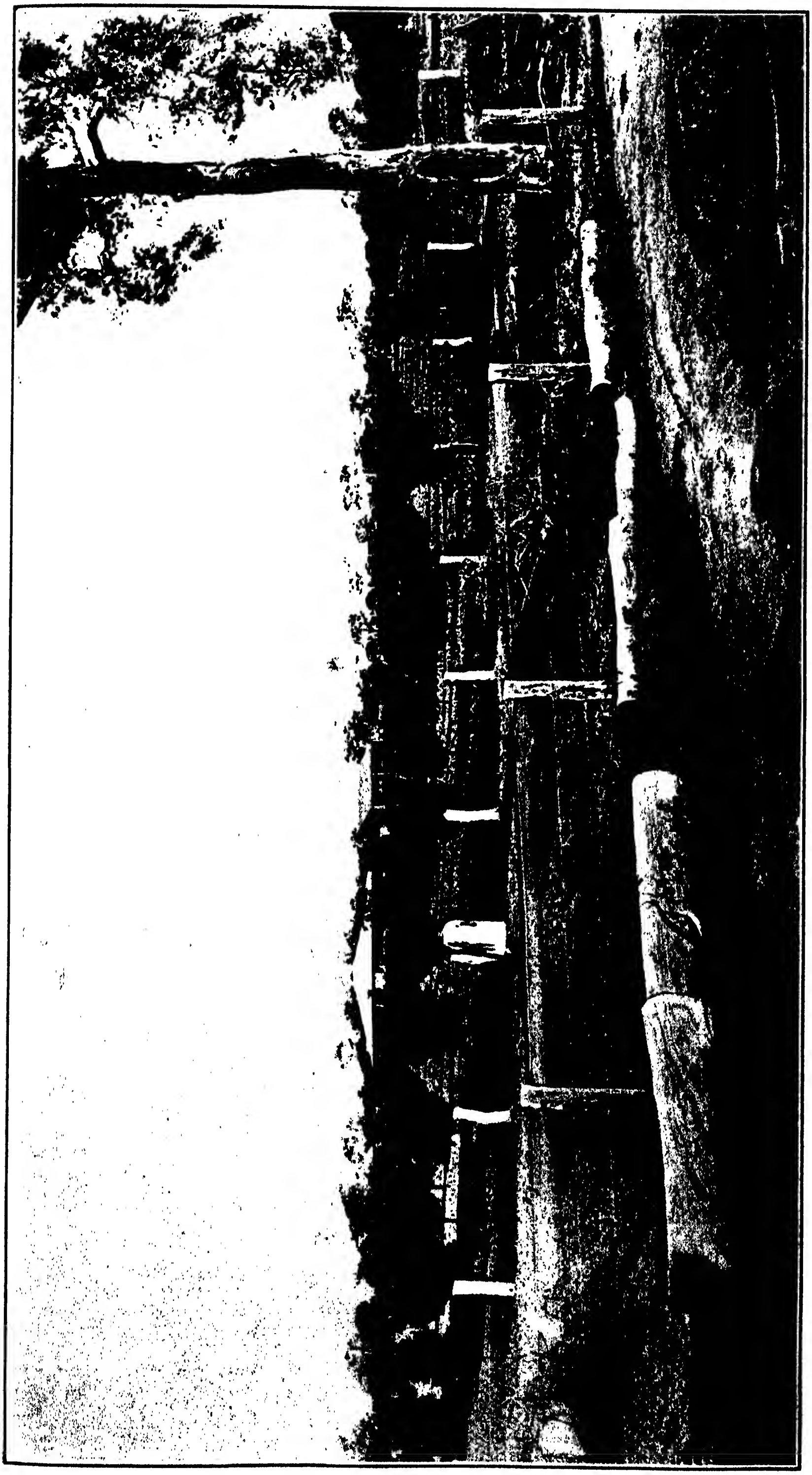


PLATE 23.—BOWEN: PORTION OF A CITRUS PLANTATION, SHOWING EMPEROR MANDARINS PLANTED 2¼ YEARS AGO. DWELLING-HOUSE AND PACKING-SHED IN THE BACKGROUND.

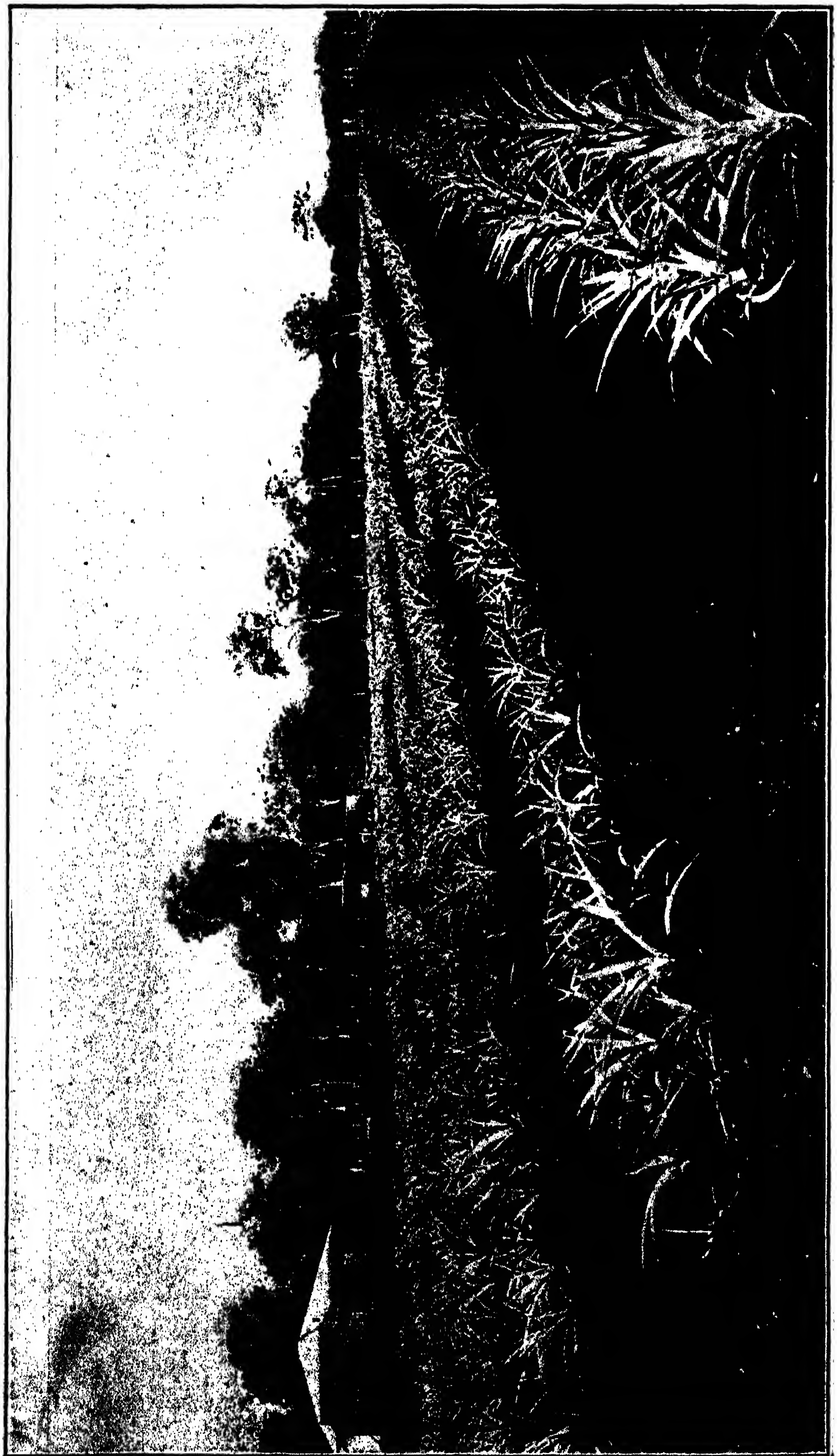


PLATE 24.—YOUNG PINE SUCKERS (SMOOTH LEAF) ON A BOWEN PLANTATION.

Horticulture.

THE PIGEON PEA.

Mr. W. McLean, of Spring Vale Experimental Farm, Boggabri, New South Wales, sends us the following notes of the *Cajanus Indicus*, or Indian Pigeon Pea:—

The seed should be planted in early spring, about 2 in. deep, and be well watered, when a light crop of peas may be obtained at the end of the summer. If frosts are severe, cover the plants lightly during the first winter. The tree will bear flowers throughout the winter, and towards the end will be one mass of flowers and pods. My trees are now so covered with flowers and pods that I have to prop the limbs up to keep them from breaking off. I may mention that the seeds are easily germinated. The tree is a quick grower, and very ornamental, and, once well established, is fairly hardy and mostly always in flower. The peas can be used dry or green.

Mr. McLean also contributes the three following items of interest to fruitgrowers and others:—

GRAPE TOMATO.

This tomato is little known in these States. It makes an attractive arbour vine, with a profusion of delicious fruit for preserving, and it is very easily grown. Seeds require to be planted early in spring, so as to give the vine a long summer.

RADISH (THE CHINA ROSE).

This is a radish that is little known. It is a delicious radish, with a beautiful colouring from light red, at the top, to almost pure white at the tip; very suitable for private gardens.

FEIJOA SELLOWIANA, OR PINEAPPLE GUAVA.

This is a fruit suitable in many parts of Australia. A relative of the common guava, but very much superior to it. The fruits are considered delicious by many people, and a few of them will perfume a room with a pleasing fragrance. It is considered hardy, and will stand frost, down to 10 degrees above zero. It is considered very ornamental as a hedge shrub. It is very ornamental when in flower.

SOWING PEPPERINA SEEDS.

Mr. J. F. Bailey, Government Botanist, advises that the seed be sown about half an inch deep, in soil placed in a shallow box, at the bottom of which a layer of charcoal covered with dry grass should first be placed for drainage. When the seedlings are about 2 in. high, pot each off into a receptacle, such as a 1-lb. jam tin (assuming that a 4-in. flower pot is not available) filled with soil. Holes should be made in the bottom of the tin, and other drainage requirements provided, as above stated. When the plants are about 15 in. high, plant out (during showery weather, if possible) into the permanent situations. Keep the soil continually moist from the time of sowing the seed until the plants have become firmly established.

Tropical Industries.

COFFEE AND COFFEE RUST IN JAVA.

In Doctor Copeland's report on a visit to Java, published in the "Philippine Agriculturist and Forester" (April, 1915), he discusses the subject of disease, and, as he states in the following extract from his report, it would appear that a new species of pest of known parentage has appeared which has characters specifically different from those of the parent coffee rust in Ceylon. The extract referred to was republished in the "Agricultural News," Barbados, of 28th August, and reads as follows:—

"The coffee rust attacked Java several years before it reached the Philippines, and absolutely nothing but difference in the two Governments is responsible for the fact that Java has still an exceedingly important and profitable coffee industry, while that of the Philippines has been dead for the past twenty-five years. The Javanese Government met the coffee rust promptly with a fight by means of fungicides, by selection of the most resistant plants to be found locally, and by the importation of every other kind of coffee which could be found in the world. The result is that the various speciee of coffee which are now being experimented with at Los Banos, and in almost every other similar institution in the tropics, have all been brought to our attention by the Government of the Dutch Indies. The first of these to show great promise was Liberian coffee. This was widely heralded as a rust-resisting species, and was extensively planted in Java, and to a lesser extent in many other parts of the Old World tropics.

"It developed after a time that the quality of the marketed Liberian coffee was such that it could only be raised with a profit where labour is exceedingly cheap, and that even here it was at a serious economic disadvantage. The Dutch Government met this difficulty by a careful study of methods of preparation, with the ultimate result rather recently obtained—and for which, although I have myself made a considerable study of the subject, I was absolutely unprepared—that the Liberian coffee produced in Java is now being marketed at a price above that of the Arabian coffee for which Java itself is so famous.

"A wholly new and unexpected difficulty then presented itself. The Liberian coffee began to be attacked by rust, and these attacks increased in virulence year by year, until the coffee rust of Java now attacks Liberian coffee with approximately the same violence as Arabian. This is at the same time a matter of prodigious practical importance, and a fact of the utmost scientific interest. Neither the coffee nor the coffee rust is native in Java. It is practically impossible that the rust which now attacks the Liberian coffee should be anything else than a descendant of the rust which was formerly able to attack Arabian coffee but not Liberian. In other words, the pest has in the course of a number of years developed wholly new properties. Uninfected Liberian coffee has been exported from Java and raised elsewhere, and found immune to the

rust of the other regions. At the same time, new importations of Liberian coffee, immune to rust in the places of origin, have been brought into Java and promptly attacked. Now, the ability to live on a particular host is in very many cases regarded as a good specific character of a fungus. It can accordingly be regarded as definitely established that there has been developed in Java during the last twenty-five years a fungus of known parentage, but which now has characters specifically different from those of the parent coffee rust of Ceylon. This is the most satisfactory case known to me in the whole realm of science, of the evolution of a new species from a known parent within a definitely known length of time, and under conditions which are a matter of satisfactory record.''

Statistics.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1915 AND 1914, FOR COMPARISON.

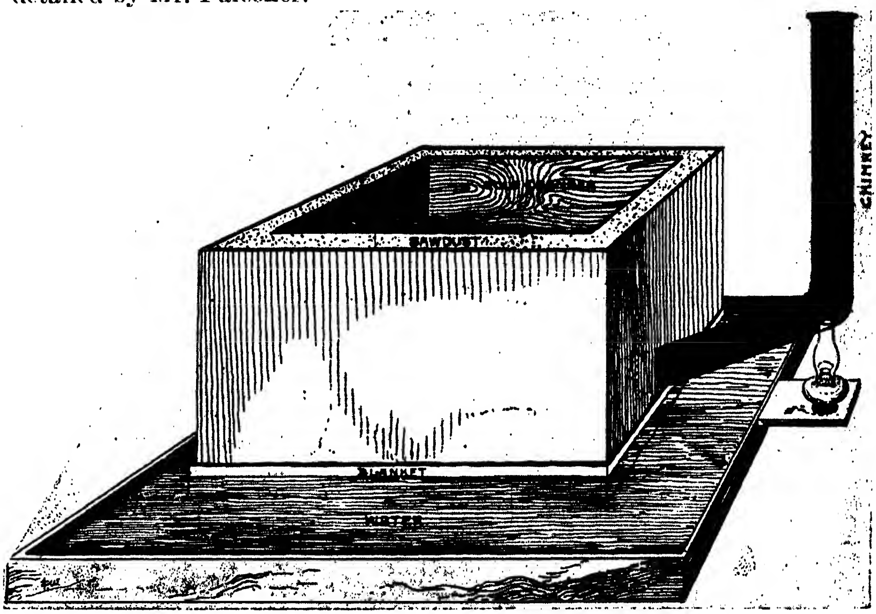
Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1915.	Oct., 1914.
North Coast.	In.		In.	In.
Atherton	0·74	13	0·25	1·50
Cairns	1·60	27	0·17	2·32
Cardwell	1·74	27	0·78	3·14
Cooktown	0·94	27	1·35	0·86
Herberton	0·96	27	0·19	0·95
Ingham	1·39	22	3·35	3·39
Innisfail	2·45	27	2·01	7·33
Mossman	3·31	5	1·51	4·22
Townsville	1·18	30	0·15	0·38
Central Coast.				
Ayr	0·88	27	3·44	0·08
Bowen	0·88	27	2·02	0·54
Charters Towers ...	0·75	27	0·03	0·01
Mackay	1·69	27	0·99	3·86
Proserpine	1·48	11	1·95	3·18
St. Lawrence ...	1·69	27	2·08	5·77
South Coast.				
Biggenden	2·23	14	1·01	4·05
Bundaberg	1·97	27	0·80	6·36
Brisbane	2·71	64	0·25	2·47
Childers	2·02	19	0·27	4·95
Crohamhurst ...	3·74	22	0·21	6·42
Esk	2·45	27	0·50	3·66
Gayndah	2·24	27	0·11	2·94
Gympie	2·42	27	0·16	4·94
Glasshouse M'tains	3·40	6	0·20	3·45
Kilkivan	2·59	27	0·45	1·19
Maryborough ...	2·11	27	0·11	5·00
South Coast—continued:	In.		In.	In.
Nanango	2·28	27	0·83	3·12
Rockhampton ...	1·65	27	1·72	5·69
Woodford	2·74	27	0·21	3·92
Yandina	3·28	21	0.83	6·25
Darling Downs.				
Dalby	2·27	27	0·38	1·45
Emu Vale	2·60	17	0·31	2·16
Jimbour	2·01	24	0·16	0·99
Miles	2·09	27	0·42	2·73
Stanthorpe ...	2·48	27	0·33	2·46
Toowoomba ...	2·56	27	0·26	3·96
Warwick	2·42	27	0·02	2·70
Maranoa.				
Roma	1·84	25	0·16	0·82
State Farms, &c.				
Gatton College ...	2·56	14	0·05	3·96
Gindie	1·17	13	0·83	4·43
Kamerunga Nurs'y	1·53	23	0·25	3·71
Kairi	...	...	Nil	0·84
Sugar Experiment Station, Mackay	1·60	16	1·61	4·75
Bungeworgorai ...	...	...	0·16	1·36
Warren	...	...	3·09	2·85
Hermitage ...	2·15	7	0·20	1·90

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year and for the same period of 1914, having been compiled from telegraphic reports, are subject to revision.

Science.

ARTIFICIAL COLD.

At the request of a correspondent, we reprint an article on the above subject which we received in 1902 from Mr. G. Monks, One-mile, Gympie, a very instructive and interesting paper read by Mr. John Falconer, C.E., at an agricultural conference held in Bundaberg in June, 1893. As we are now approaching the hottest summer months, perhaps some of our readers might like to make a trial of the process as detailed by Mr. Falconer.



The general idea is thus stated:—When by any process, a change is produced in the form of matter, it undergoes certain developments; thus, when gas under pressure becomes liquefied, it gives off a great amount of heat, and when it again is allowed to expand it takes up heat from its nearest surroundings. That is the principle in all plans or systems whereby artificial cold is produced. If, when air is compressed in a cylinder, it is surrounded by water, the temperature of the cylinder will be reduced; but when the air is released again, if it be conducted through a pipe surrounded by water, the latter will be frozen, as the air in expansion takes up as much heat as it had before it was cooled after being reduced, and it takes up heat from whatever it comes in contact with. Mr. Falconer exhibited a cylinder into which gas had been pumped with great force, until there was a pressure inside it of nearly 300 lb. per square inch. Now, if a small pipe were attached to this cylinder, and the pipe were conducted through a bucket of water, the expanding

liquid gas would recover from the water all the heat it had before it was condensed and liquefied in the cylinder, and the expanding of the gas would cause the absorption of the heat surrounding the pipe and reduce the temperature of the water until it becomes frozen.

A model of a safe was then shown. Of this safe the author said—

"Twenty years ago I designed and had constructed for a friend near Brisbane a dairy on the principle here shown, and on the hottest day in summer you could always be sure that the dairy was a cool place; it was constructed on the side of a hill, and is in use to the present day (1893). The model was thus described:—A box having the appearance of an ordinary safe. It is double, and between the inner and the outer boards there is a packing of sawdust, which is a non-conductor of heat. It is airtight, except at the bottom. It stands in an open trough in which there is water, and around the bottom there is a casing of four plies of blanketing. At the side there is an air chimney, and under the elbow of the pipe is an ordinary kerosene lamp, the chimney of which enters the funnel through a small tube. The combustion of the air in the lamp creates an expansion of the air in the funnel; if the lamp is turned up high, a roaring is heard in the funnel, caused by the rush of expanding air through it, for the heated air passing up the funnel causes a partial vacuum in the box, expanding the air in it, and causing a draught. The outer air having no inlet, except through the wet blanket, becomes rarified in its passage through the chamber, and the desired effect—*i.e.*, cold storage—is produced, for the expanding air must get heat, and it gets it from whatever it comes in contact with; in other words, the heat is drawn from whatever is in the chamber to supply the requirement of a natural law. If a larger lamp is used, the expansion becomes greater, and whatever is in the chamber will be frozen.

The dairy constructed by Mr. Falconer was built on this principle, with a brick chimney. Butter was kept in it for months in sound condition, and the interior was so cold that no one would care to remain in it for half-an-hour.

We have, unfortunately, not got the model of Mr. Falconer's safe, but Mr. Monks has suggested the accompanying construction.

BANANA ASH.

A sample of banana ash was recently forwarded to Mr. J. C. Brünnich, Agricultural Chemist, for an estimate of its potash contents. This sample has been analysed with the following result:—

"The sample of crude banana ash submitted, contained in percentage:—

Potash	16·6
Lime	5·0
Phosphoric acid	1·4
Insoluble, chiefly carbon	34·7

This ash would be worth, at the present time, about £8 per ton. The yield is very small (about 1 per cent.), which agrees with our previous analyses; and the commercial utilisation of the banana stalks for production of potash manure is out of question. At the same time, it shows the importance of allowing the stalks to rot in the fields to return their mineral constituents to the soil."

LIME REQUIREMENTS OF QUEENSLAND SOILS.

By J. C. BRÜNNICH AND E. H. GURNEY.

The application of lime to our agricultural lands has been advocated for years in this Journal and by the officers of the Department, and recent investigations appear to indicate that the need for liming is even greater than anticipated.

Every farmer is familiar with the term **sour** or **acid soil,** but may not be aware of the far-reaching effect which the reaction of the soil has on the production of crops. A soil may have an **acid, neutral,** or **alkaline reaction**; and its fertility may largely depend on this condition.

Although most of our fertile agricultural soils have a slight acid reaction, it may be safely asserted that the great majority of crops would do better if lime could be added in sufficient quantities to reduce this acidity and make the reaction as near as possible neutral. A few crops are the exception, and, for instance, potatoes do better and are freer from disease when grown on slightly acid soil.

A **high acidity** in a soil affects the plants adversely by a direct action on the root system, and by an indirect action on the micro-organisms in the soil. A **high alkalinity** again is not an advantage, and if such alkalinity is due to soda carbonate, the soil may be quite sterile.

The acidity of a soil is easily tested, by bringing the moist soil into contact with blue litmus paper, which according to the degree of acidity will become more or less reddened; when done with care, a fair idea with regard to the amount of lime required for such soil may be obtained.

The actual amount of lime present in a soil, whether found by extracting with hydrochloric acid or dilute citric acid, is not a sufficient guide to tell the farmer what amount of lime should be added to bring the soil to neutrality; and from the table published at the end of this paper it can be easily seen that some soils, containing a fair or even high amount of lime, are still in need of a heavy dressing with lime.

F. T. Veitch elaborated an accurate estimation of soil acidity with the aid of lime water ("Journal American Chemical Society," 1902, Vol. XXIV., p. 1120); and the results obtained by his method of the lime requirement of a soil show a fair agreement with the crop results on the addition of lime.

Quite recently H. B. Hutchinson and K. McLennan published a simple and rapid method for the determination of **lime required for soil neutralisation** ("Journal of Agricultural Science," 1915, Vol. VII., Part 1); and this method was used for the testing of some of our typical Queensland soils. The results of these tests are appended in tabulated form. In the table the amounts of lime (expressed as CaO) found by analysis are given in percentage, and the amount of lime necessary for neutralisation of the soil to a depth of 12 in. are given in cwt. of lime carbonate per acre. [A percentage of ·056 of lime oxide (CaO) or ·1 of lime carbonate ($CaCo_3$) is equal to about 17½ cwt. of lime oxide or 31·2 cwt. of lime carbonate per acre-foot.]

Air-slaked stone or **quicklime,** when applied to a soil, will have the most powerful and quickest action; it not only neutralises any acidity, but has a very strong action on the organic matter present in the soil, and also on the micro-organisms in the soil, with a partially sterilisation effect.

As a rule, we recommend to our farmers the use of **lime carbonate,** in form of finely ground **limestone** or **marble,** or **coral and shell sand;** but, in order to be effective, the limestone must be ground as fine as possible.

Hitherto it was considered necessary to apply the lime as a top dressing, as the leaching effect of rain water will tend to wash the lime into the soil; but recent experiences have shown that this action is extremely slow, and for this reason it is better to thoroughly mix the lime with the soil after application by ploughing or scarifying.

Unfortunately, at the present time, some prohibitive prices have been charged for agricultural lime in some instances, and, although limestone screenings are obtainable at the quarry for 5s. to 7s. 6d. per ton, as much as £2 10s. per ton has been charged for shell sand of inferior quality. Any finely-ground limestone should not cost more than about 10s. per ton, so that in most localities the cost of lime to the farmer, after paying all charges for freight, &c., should not be more than £1 to £1 10s. per ton; and at such a price the farmer could profitably apply the necessary heavy dressings.

It would be very interesting and of great value if on some farms experiments were made applying the amounts of lime recommended for neutralisation, and to compare the crops obtained from limed and unlimed portions for a few seasons.

Locality.	Soil.	Per Centage Lime (CaO), Soluble in— Hydrochloric Acid.	Per Centage Lime (CaO), Soluble in— Citric Acid.	Reaction.	Lime Required. Lime Carbonate ($CaCO_3$). Cwt. per Acre.
Yandina	Black loam (swampy)	0·27	·0274	Strongly acid	150
Buderim Mountain	Chocolate sandy clay	0·27	·0980	Acid	100
Cooroy	Brownish fine sandy loam	0·11	·0764	Very acid	94
Proserpine	Brown clay	0·47	·0824	Acid	94
Mackay	Chocolate fine sandy loam	0·95	..	Acid	87
Buderim Mountain	Sandy clay	0·37	·1195	Acid	78
Proserpine	Brown sandy clay	0·43	·1000	Acid	78
Woodford	Brown sandy loam	0·20	·0818	Strongly acid	78
Bundaberg	Reddish-brown loam	0·46	·0826	Slightly acid	70
Rockhampton	Grey sandy clay	0·43	·0936	Strongly acid	47
Ayr	Yellowish-grey loam	0·28	·1074	Acid	41
Kingaroy	Chocolate fine sandy loam	0·41	·2244	Acid	41
Mulgrave	Brown sandy loam	0·32	·0575	Acid	39
Nambour	Brown medium sandy soil	0·12	·0914	Acid	37
Beenleigh	Brown fine sandy loam	1·57	..	Acid	31
Bundaberg	Reddish fine sandy loam	0·54	·1978	Acid	31
Greenmount	Dark-brown loam	1·36	·2454	Acid	28
North Arm	Yellowish-grey sandy clay	0·18	·1312	Slightly acid	27
Westwood	Dark-grey sandy clay	1·56	·2500	Slightly acid	27
Ayr	Greyish-brown loam	1·04	·1474	Acid	26
Stanthorpe	Grey sandy clay	0·18	..	Acid	25
Bundaberg	Red volcanic clay	0·58	·1812	Acid	25
Tarampa	Greyish sandy loam	1·70	·2424	Acid	22
Gatton	Black medium sandy soil	1·07	·1975	Slightly acid	22
Miles	Brown medium sandy soil	0·31	·0736	Acid	16
Murgon	Dark-grey sandy loam	0·86	·2660	Neutral	12
Mackay	Brown loam	0·92	·2064	Acid	12
Bowen	Brown sandy clay	1·48	..	Neutral	6
Goombungee	Dark alluvial sandy loam	0·73	·1364	Acid	5
Bungeworgorai	Dark-buff sandy clay	0·21	·0620	Neutral	0
Nobby	Black sandy loam	2·19	·2922	Slightly alkaline	0
					Lime ($CaCO_3$) in excess of neutrality; Cwt. per Acre.
Fassifern	Light-brown clay	1·26	·4000	Neutral	*1*
Westbrook	Black sandy loam	1·60	·3216	Neutral	*1*
Bowen	Dark-brown sandy loam	1·47	..	Neutral	*8*
Rosewood	Grey sandy clay	0·98	·3392	Strongly alkaline	*11*
Kynuna	Brown fine sandy loam	1·77	·5606	Alkaline	*17*
Greenmount	Black loam	2·86	·4782	Alkaline	*25*

Botany.

NOTES BY THE GOVERNMENT BOTANIST.—No. 1.

PLANTS POISONOUS TO STOCK.

Owing to scarcity of feed during the past season several plants, at other times almost untouched, have caused considerable injury to stock. Among these, *Hoya australis* and *Gastrolobium grandiflorum* have been particularly severe; and the following interesting accounts regarding their effects on stock have been received:—

WAX-FLOWER (*HOYA AUSTRALIS*).

This succulent twiner has for many years been looked upon with disfavour by stockowners, and was referred to by Bailey and Gordon in "Plants Reputed Poisonous to Stock" (1887) as the cause of the deaths of a number of sheep while being driven through a scrub in which a quantity of it was growing.

During the past few months quite a number of letters have been received from stockowners from different parts of the State forwarding this plant for identification, with the remark that they suspected it of causing losses amongst stock. As, judging from the numerous specimens received for name and information, the plant does not seem very well known, it has been deemed advisable to publish the following description and notes, together with a figure which should aid in its identification.

In December, 1914, specimens were forwarded from J. J. O'Dempsey, Freestone Creek, as causing the death of several cattle; these specimens were submitted to the Agricultural Chemist (J. C. Brünnich), who reported that they did not respond to the specific tests for the more commonly recurring organic poisons (prussic acid, saponin, and alkaloids).

In August last, a quantity of the plant was forwarded to the Editor of the "Queensland Grazier" by A. J. McCanny, Nanango, with the following remarks:—"Last week two fat bullocks died in one of my paddocks; in fact, one bullock was not quite dead when I found him. He had been down some hours and could not get up, and the whole time I was with him he was in a fit of convulsions. I afterwards skinned him and opened him up; he was a perfectly sound bullock, with one exception, and that was in the part called the 'Bible.' I felt this, and it was as hard as a rock; and when I opened it, the contents, instead of being soft, were hard and dry and very light. Some of the leaves of the plant now sent were found in the stomach."

These specimens were handed over to the Director, Stock Experiment Station, Yeerongpilly, who reported as follows:—"Four guinea pigs were placed in a cage on the 7th instant (August), and fed with *Hoya* vine. Two of the youngest ones developed symptoms of paralysis on the

PLATE 25.—WAX-FLOWER (*Hoya australis*).

second day; one died on the third day, and one on the fourth day; the remaining two guinea pigs, which were older, developed only slight symptoms of paralysis, but eventually recovered."

About the same time, the Department received a letter from H. H. C. West, Jandowae, who reported the loss of 15 head of cattle through eating this plant. All seemed to be affected in the kidneys and hind quarters, but that other cattle had recovered, especially those drenched with Epsom salts.

A. McGown, M.R.C.V.S., recommends the following remedy:—"1 lb. Epsom salts and 1 lb. treacle should be given as soon as the animal is noticed to be sick, which should be followed daily with 2 dr. potassium iodide dissolved in half a pint of water."

The following is a brief description of the plant:—

"A succulent twiner, glabrous or the leaves sometimes with a few scattered hairs. Leaves thick, fleshy, on short stalks, ovate, obovate or nearly orbicular, obtuse or shortly pointed, rounded or almost cordate at the base, 2-4 in. long. Flowers white, in simple umbels borne on short stalks. Fruit (follicles) several inches long, slender; seeds numerous, with tufts of silky hairs attached."

WALL-FLOWER OR HEART-LEAVED POISON BUSH.

(*GASTROLOBIUM GRANDIFLORUM.*)

With regard to this well-known plant of the north-western parts of the State, the following information received from H. A. Crawford, Maryvale Springs, Yalleroi, are of such interest that they are here given to supplement the former articles in this Journal—namely, September, 1889, by F. M. Bailey; and August, 1908, by J. C. Brünnich. In a letter dated the 15th of September last Mr. Crawford writes:—"There are a great many conflicting opinions regarding it still being poisonous after it is cut, even among men who have had years of experience amongst it. I myself fed two sheep in a pen with some which had been cut for three months and five days, and both sheep appeared to eat an equal quantity of it. One died, and the other was hardly affected at all—just seemed a bit sick for a few days, but not enough to stop it from eating and drinking as usual." After reading the above-mentioned articles, Mr. Crawford, in a further letter, states:—"The poison in this plant cannot be of a volatile nature, as I have known the dry plants, which have been cut and lying out exposed to the weather, to kill both horses and sheep when it had been cut three months and five days. I opened a horse which had died from eating this dried poison, and the stomach appeared to have patches of a white hard substance like solidified froth adhering to it, and the tissues of the stomach appeared to be very tender. You could poke your finger through it anywhere. The first symptoms the horses showed were that they stood with their heads down close to the ground and their legs wide apart. You could ride up to them and crack a whip alongside of them, and they would not appear to know you were there. If hit with the whip, they would take a few steps forward and seem to have hard work to keep their balance and could

PLATE 26.—WALL-FLOWER OR HEART-LEAVED POISON BUSH (*Gastrolobium grandiflorum*).

only do so by walking with their legs wide apart. In almost every case, the lips swelled up considerably, and in some cases also the whole head, and they kept their mouths open slightly with the saliva dripping out as if their mouths had been burnt. The inside of the mouth also looked as if it had been scalded or burnt in patches. In the later stages they all appeared to get spasms and twitchings, and very often would spin round several times before they would fall down. They would get up again, and would stand with legs wide apart, with the ears and muscles all twitching and the flank muscles continually contracting as if with griping. They all appeared to go blind, and the eyes would not blink if a stick was waved close to the eye unless it happened to touch the eyelashes. I tried to drench several with oil, but could not get any to swallow. Some that were put into a yard with water kept dipping their mouths into it and letting it run back into the trough. These afterwards recovered. Some of them passed what seemed to be the mucous lining of the stomach or bowels, and from then on began to eat a little. The sheep, which I fed in a pen, and which died, showed similar symptoms to the horses. Out of nine horses poisoned in one night three died and the rest recovered."

BARB-WIRE INJURIES.

We are frequently asked what is the best way to deal with injuries sustained by stock—especially horses—by contact with barbed wire. Dr. A. S. Alexander, Department of Horse Breeding, Wisconsin advises:—

"After a barb-wire accident, do not apply axle grease or any rancid ointment to the wound. Wash the wound thoroughly with warm water. Then clip the hair as close as possible around it, and wash again to remove any hair or other foreign substance.

"When sand or hair has lodged in the depths of a deep cut, never use a wet sponge to clean it out. Use a piece of absorbent cotton or cotton batting. There will be much less risk of infection.

"It will be useless to put stitches in a wound that is very deep or ragged, or that is located in a place not in perfect rest when the animal is making natural movements.

"Dry dusting powder has a healing effect on barb-wire wounds and other large moist cuts and abrasions. Such a powder may be prepared cheaply by mixing together equal parts of slaked lime, sulphur, and charcoal.

"Prevent lock-jaw dangers in nail wounds of the hoof by opening them up freely, which provides drainage for serum and pus. Saturate with a solution of corrosive sublimate and water in the proportion of 1 to 500. Cover with dusting powder, absorbent cotton, and a bandage. This treatment should be repeated daily until the wound is healed."

[Mr. McGown, M.R.C.V.S., Veterinary Surgeon to the Queensland Department of Agriculture and Stock, is quite in accord with this treatment for barb-wire wounds.—Ed. "Q.A.J."]

Entomology.

REPORT OF THE ENTOMOLOGIST TO THE BUREAU OF SUGAR EXPERIMENT STATIONS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following monthly report from Mr. E. Jarvis, Entomologist to the Bureau:—

"At this time of the year, when neither grubs nor beetles are procurable for experimental purposes—the former having transformed into pupæ from which the latter have not yet emerged—opportunity is afforded for reviewing past work and preparing for future investigations. The present season is unusually interesting, owing to the continuance of dry weather and consequent establishment of abnoraml climatic conditions which are certain to exercise important influences on the economy of soil-frequenting larvæ.

"In a previous report, when alluding to what I have termed meteorological control, it was mentioned that during September and October, 1914, larvæ of our mealy-backed cockchafer had pupated unusually near the surface and large numbers had been ploughed up on volcanic soils. This exceptional circumstance was no doubt due to the abundant rainfall experienced at Gordonvale during August, 1914, thirteen days of which were wet, the registered amount having exceeded the average for that month by an additional 3·45 in. It has already been pointed out that excessive wet about that time of year tends to induce grubs to pupate near the surface, and, should hot weather set in shortly after pupation and continue for a month or so, great numbers of pupæ lying in light volcanic and sandy soils under seed cane would be likely to perish owing to the earth above them drying out before they were able to transform into beetles.

"Unfortunately, as foretold in a previous monthly report, further rains about the end of October, 1914, put an end to our hopes in this direction, by maintaining ideal soil conditions for the development of cane beetles. To the occurrence of this latter rain must, I think, be attributed in great measure the severity of the recent outbreak at Greenhills, where no less than 25 tons 11 cwt. of grubs were collected during March, April, and May, 1915, at a cost of £749 sterling.

"It appears more than likely that this serious monetary loss would have been very considerably reduced had the dry weather continued throughout October.

"No rain fell at Gordonvale last month, and as on outcome of prolonged drought grubs infesting light soils started to pupate about the middle of August, three weeks earlier than last year.

"Wishing to ascertain the position of existing pupæ, tests were applied on the 3rd October to a plot of affected volcanic land by digging a number of pits 5 ft. square by 2 ft. deep at varying distances apart.

" The first four holes contained collectively 23 pupæ, 4 larvæ, and 1 beetle of *Lepidiota albohirta,* besides 32 grubs of other species of Scarabaeidæ (principally *L. frenchi*) in various stages of growth.

No pupæ were unearthed nearer than 1 ft. from the surface, and none deeper than about 15 in.

"The majority were lying in earth that was nearly dry.

"A month later further tests were made on the same piece of land, when it was found that the soil had become slightly drier and fully 20 per cent. of pupæ perished; while the remained had transformed into beetles which were resting in their pupal chambers awaiting the occurrence of rain sufficiently heavy to soften the ground and enable them to escape.

"Should the present weather conditions continue, it will be interesting to note the effect of drought on these adult insects imprisoned in the soil."

MEASUREMENT OF CATTLE BY WEIGHT.

To arrive at a close estimate of the weight of cattle, mere guesswork is not reliable. There is, however, a rule by which the weight can be very accurately determined. There is one condition in connection with this method, which cannot easily be adapted to the guessing competition of the fat bullock, say, at the National Association's Exhibition at Bowen Park. That condition is that the competitor must be able to handle the beast, and this, of course, cannot be permitted, where the weight has to be arrived at by merely studying the build and condition of the animal.

THE RULE IS—

Multiply the square of the girth by 5 times the length. Divide the product by 21. This gives the net weight of the animal in imperial stones of 14 lb. Or, to obtain the weight in scores, divide by 30.

EXAMPLE.

An animal girths 7 ft., and is $5\frac{1}{2}$ ft. in length.

The square of the girth is $7 \times 7 = 49$; 5 times the length is $27\frac{1}{2}$. Then $49 \times 27\frac{1}{2} = 1{,}347\frac{1}{2}$.

Divide this by 21. Result: 64 stones 2 lb., or 898 lb. Or, dividing by 30. Result: 44 scores 18 lb., or 898 lb.

If the animal is very fat, $\frac{1}{15}$ should be added to the weight thus obtained; if not moderately fat, $\frac{1}{18}$ should be deducted.

General Notes.

A GOOD FLY GLUE.

1. Melt together 6 parts of colophony, 4 of rapeseed oil, and 3 of resin.

2. Eight parts of resin, 4 parts each of turpentine and rapeseed oil, and ½ part of honey.

3. Boil to a thick paste 1 lb. of resin and 3½ oz. each of molasses and linseed oil. Apply either of these mixtures to a thick stick, and plant it in a pot filled with sand.

POLLINATING TOMATOES.

The Biologist of the New South Wales Department of Agriculture has tried a practice in vogue in the Channel Islands (Guernsey, Jersey, Alderney, and Sark), where large quantities of tomatoes are raised for the early London market. There the tomatoes are staked, and boys are frequently sent round daily to strike the stakes with a stick. The shaking thus received by the plant is said to promote pollination, and to result in a larger production of fruit. The Biologist mentioned tried the experiment with tomatoes grown under glass, and, whatever other causes may have operated, he obtained excellent results.

FUMIGATION OF EGYPTIAN COTTON SEED.

The "Board of Trade Journal" publishes the following note in regard to Egyptian cotton seed:—

H.M. High Commissioner for Egypt reports to the Foreign Office that the Egyptian Ministry of Agriculture is anxious to call the attention of all purchasers of Egyptian cotton seed to the desirability of insisting on its fumigation at the port of shipment, with the object of destroying the pink boll worm which it may contain.

It is almost certain that this parasite first reached Egypt in bales of imperfectly ginned cotton from India, and it is very probable that it will be introduced into other countries where Egyptian cotton seed is sown, unless the seed is previously fumigated.

With a view to eradicating the pink boll worm in Egypt, measures are being taken to introduce a law requiring the fumigation of all cotton seed in Egypt.

It will be some time before these measures can be universally adopted owing to the absence of adequate machinery, but in the meantime the Ministry of Agriculture is ready to fumigate small amounts of seed, supplying a certificate of fumigation with the consignment.—"Agricultural News."

MONEY IN WATTLE BARK.

In the Report of the Durban Chamber of Commerce for 1914 it is stated that the Natal wattle bark trade has suffered a check by reason of the war. The exports for the first seven months of 1914 amounted to 47,663 tons, as compared with 39,899 tons in the corresponding period of the previous year; but the total amount exported in 1914 was only 58,132 tons, valued at £286,399, as compared with 65,042 tons, valued at £309,268, in 1913. Had conditions been normal, it is stated, the exports for 1914 would have exceeded those of 1913.

The wattle-tree thrives so well in Queensland, that it appears surprising that a large business in the wattle-bark industry has not long since been built up. At one time small quantities of wattle bark were obtained, principally about Dalveen; but of late nothing has been heard of an industry which brings in from £286,000 to £309,000 per annum in South Africa.

THE "AUSTRALIAN SUGAR JOURNAL."

Those who are interested in sugar-growing in Queensland will welcome the November issue of this Journal for many reasons, the main one being that, besides the usual interesting current topics on the Sugar Industry—as, for instance, on Sugar Conferences, Workers' Accommodation Bill, Experiment Work in other Lands, &c., it gives, in this issue, a *resumé* of the Auditor-General's Report on Central Sugar Mill Companies for 1914-15. The operations of these mills are not given much space in even the newspapers published in the Sugar Districts; but we have it here almost *in extenso*, so that growers and millowners can compare notes on their respective activities. The articles in "Sugar District Notes" are also most interesting and of very great value, not only to existent cane-growers, but to prospective investors. On the whole, the November issue of the "Sugar Journal" is, in our opinion, a most valuable record of the Sugar Industry in Queensland, and well worthy of careful study.

PRICES FOR PIGS.

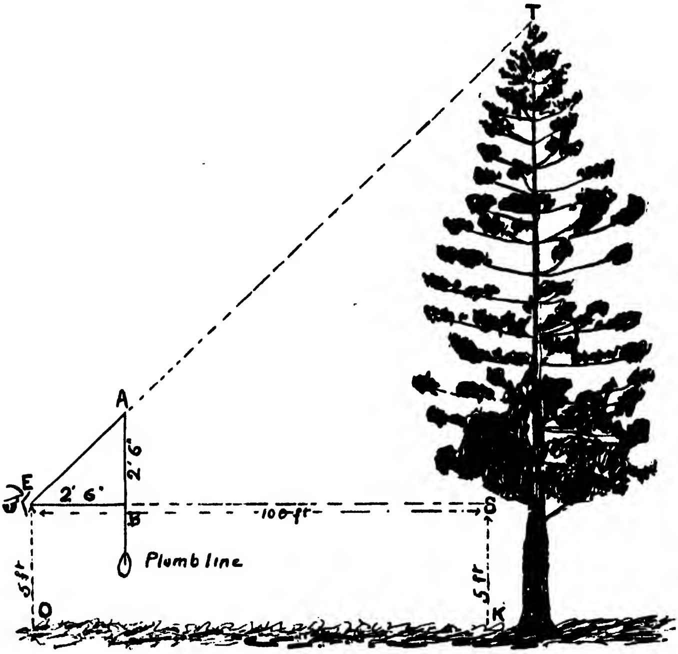
Referring to a note on high prices paid for pigs at Maryborough, which appeared in the October issue of this Journal, Mr. W. H. Davidson, Wilmount, Tambourine Mountain, writes:—" About the same date (7th September), 'back-fatters' at the Nerang pig sales sold for £9 5s., which is the highest price paid for a factory pig in this State, that I have heard of so far. Your correspondent at Tinana quotes the *maximum* price for a fat pig at Maryborough, but as the weight is not given, it leaves one in doubt, but I can quote, probably, the *minimum* for a fat pig sold at Maryborough about the year 1873, when my father sold a white pig weighing slightly over 500 lb. for £1 10s. I believe back-fatters reached the vicinity of £20 this last winter in Melbourne." Mr. Davidson forwards two cuttings from the " Australasian" of August and September, 1915, in which the prices of prime backfatters ranged from £8 to £18.

PRICE OF SILK COCOONS.

Latest advices from European sources give the price of Russian cocoons as from £1 8s. to £2 8s. per poud (36 lb.)—about 9¼d. to 1s. 4d. per lb.; 1,600 cocoons go to 1 lb., and 1 acre of land will produce 300 lb. of cocoons.

MEASUREMENT OF STANDING TIMBER.

Mr. L. M. Daniel, Elsternwick, in forwarding the accompanying sketch to "The Leader," writes:—Selectors and others frequently want to find out the quantity of timber in a standing tree. The method described here will give the contents of timber in a tree approximately, and does not take into account accurately the whole of the limbs. Cut



a piece of pine or deal board into a triangle right-angled at (B). Let the observer place the long edge of board to his eye, and move backward or forward (on level ground) until the edge of board exactly coincides with top of tree, taking care that the plumb line is along edge AB, and hangs steady. Now measure from eye to butt of the tree (say, 100 ft.). This distance, plus the height of eye from the ground, is the height of the tree. (*See* example in illustration.) ES plus EO equals TK. ES equals 100 ft; SK or EO equals 5 ft; therefore height of tree is 105 ft. Cubic contents of tree approximately. To find the cubic contents of tree, multiply the square of half the diameter of tree by 3·14, and multiply this product by half the height of tree:—Diameter of tree is 4 ft.; square of ½ diameter equals 4 by 3·14 by 52·5 equals 659·4 cubic feet.

Another simple method of ascertaining the height of a tree can be used on a sunshiny day.

Cut a stick about 12 in. long. Place it upright in the ground. Note the height of the stick above the surface and measure the length of the shadow thrown by it. Then measure the shadow of the tree. Suppose this to be 20 ft., and the shadow of the stick to be 6 in. The question then is:—If a stick 12 in. high throws a shadow 6 in. long, how tall is a tree which throws a shadow 20 ft. long (240 in.)? By simple proportion—

6 : 240 :: 12 : 480, or 40 ft.

This example obviously requires no calculation, as both stick and tree throw a shadow equal to half their height.

NATIVE ANIMALS ABSOLUTELY PROTECTED.

Tree Kangaroo (all species of Dendrolagus).
Wombat, Duck Mole or Platypus, Hedgehog, or Echidna.
Flying Squirrel or Opossum Mouse.

A CLOSE SEASON FOR NATIVE BEARS AND OPOSSUMS.

It has been notified, in the *Government Gazette*, 5th November, 1915, that Native Bears and Opossums are totally protected throughout Queensland from the 1st November in each year to the 30th April in the following year, inclusive.

Those interested in the fur trade, trappers, dealers in skins, and young people who take their holidays in the bush, who are fond of "mooning" 'possums and bears and flying squirrels, will do well to note that severe penalties attach to the breaking of the law in this respect. The penalty for killing these animals during the abovementioned close season is up to £5. Cyanide of potassium and other poisons lately used for killing fur-bearing animals are expressly unlawful, and anyone making use of such substance is liable to a fine of £10. By a clause in the Act, however, when Opossums are found to injure any field or garden crops, it is lawful to destroy them. Aboriginals may also kill any marsupials or native bears for food, but it is unlawful to sell or buy any skins thus procured.

ERADICATING COUCH GRASS FROM A HEDGE.

When couch grass has been allowed to make a heavy growth on land unoccupied by crops, it can be got rid of by repeated working; but where it encroaches, as often happens, beneath a Duranta or Privet hedge, it is more difficult to deal with it. The "Nor'-West Farmer," Manitoba, gives the following advice in the latter case to a correspondent:—

"There are two methods that occur to us as being likely to be practical. One is to take two strips of tar paper. Lay one down lengthwise, like a carpet, alongside the row of shrubs. Lay the other strip down the other side. Cut in from the sides at points opposite the shrubs, so as to push one piece well over the other, and so cover every inch of ground down the row, except just where the shrubs come through. This will seal the ground below the paper. Then throw an inch or so of soil

over the paper, so as to hold it down tightly in place. By sealing up the area absolutely, the couch grass beneath will be smothered out in one season, or, at the most, in two. It may be necessary to use four strips in order to get a wide enough area. If the hedge plants are small, they may suffer somewhat for lack of rain about the roots, but one could easily see if any harm was resulting.

"The other method is to spread a heavy mulch of strawy manure about the rows. This could be done at any time of year. Spread the mulch widely enough. This will not be especially good treatment for the caraganas, but the effect of it on the couch grass will be to cause it to develop its system of root-stocks right up at the surface of the ground. The next year one can select a hot dry time in July to remove the mulch. Then fork up, carry off, and burn the spreading root-stocks. We have known of this plan being tried in the West with reputed success. One must remember, however, that couch grass root-stocks are full of buds, and that even an inch of the root-stocks will produce a new plant. The extermination, therefore, must be thorough, and any bit of root escaping must be dug out when it grows later on.

"We should prefer to try the tar paper method first."

Answers to Correspondents.

GAS LIME.

" E.B.," Palmwoods—

Gas lime may be used like ordinary air-slaked lime, broadcasted at the rate of 1 ton per acre. It is very rare that this lime contains any injurious substance. You will find full information about the value and use of lime in the issue of this Journal for May, 1914.

DROMOTHERAPY—YEOMAN.

"IGNORAMUS," Enoggera—

Dromotherapy is a term derived from the Greek word *dromas,* running. Hence Hippodrome. It is the term for a kind of running adopted in military drill—the science of running. From this root also the camel known as the Dromedary derives its name, as being a swifter animal than the Bactrian camel, which has two humps on its back, the Dromedary having only one. The word "Yeoman" has no reference to a farmer, as many suppose. In the time when England was celebrated for its archery, the Yew-tree was very much in requisition, as all the bows used at the battles of Crecy, Poictiers, Flodden, and Agincourt were made of this wood. Those who bore the bow in battle were called "Yew-men," whence was derived the term "Yeomen." Doing "yeoman service" implied service on the battlefield, not on the farm.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER, 1915.

Article.		NOVEMBER. Prices.
Bacon	lb.	1s. 2d. to 1s. 4½d.
Bran	ton	£4 15s.
Broom Millet	"	£37
Butter	cwt.	140s.
Chaff, Mixed	ton	£8 to £10
Chaff, Oaten	"	£10 to £12
Chaff, Lucerne	"	£13 to £14
Chaff, Wheaten	"	£8 10s. to £9 10s.
Cheese	lb.	11d.
Flour	ton	...
Hams	lb.	1s. 3½d.
Hay, Oaten (Victoria)	ton	£16
Hay, Lucerne	"	£8 to £9
Honey	lb.	3d. to 4½d.
Maize	bush.	5s. 9d. to 5s. 10d.
Oats	"	3s. to 4s. 9d.
Onions	ton	£7 10s. to £8
Peanuts	lb.	3d. to 4d.
Pollard	ton	£6 10s.
Potatoes	"	£20
Potatoes (Sweet)	cwt.	3s. to 4s.
Pumpkins	ton	£10
Eggs	doz.	1s. to 1s. 2d.
Fowls	pair	4s. to 7s. 6d.
Ducks, English	"	3s. 9d. to 5s.
Ducks, Muscovy	"	5s. to 6s. 9d.
Geese	"	3s. 6d. to 5s.
Turkeys (Hens)	"	9s. to 11s.
Turkeys (Gobblers)	"	17s. to 22s.
Wheat (Chick)	bush.	5s. 9d to 6s.

VEGETABLES.

Cabbages, per dozen	2s. 6d. to 7s. 6d.
Cauliflowers, per dozen	...
Beans, per sugar bag	2s. to 7s. 6d.
Beetroot, per dozen bunches	9d. to 1s.
Carrots, per dozen bunches	9d. to 1s.
Chocos, per quarter-case	2s. 6d. to 3s. 9d.
Cucumbers, per dozen	3d. to 1s. 2d.
Custard Marrows, per dozen	2s. to 4s.
Vegetable Marrows, per dozen	2s. to 4s. 6d.
Parsnips, per dozen bunches	...
Lettuce, per dozen	...
Peas, per sugar bag	2s. 6d. to 10s.
Celery, per dozen bunches	1s. 6d. to 2s. 6d.
Sweet Potatoes, per cwt.	3s. to 4s.
Table Pumpkins, per cwt.	6s. to 8s.
Tomatoes, per quarter-case	2s. 6d. to 8s. 6d.
Turnips, per dozen bunches	8d. to 9d.
Rhubarb, per bundle	1s. to 1s. 6d.

SOUTHERN FRUIT MARKETS.

Article.	OCTOBER. Prices.
Bananas (Queensland), per case	13s. to 15s.
Bananas (Fiji), per case	22s.
Bananas (G.M.), per case	20s.
Bananas (G.M.), per bunch	6s. 6d.
Mandarins, per case	15s. to 20s.
Mangoes, per case	6s. to 8s.
Oranges (Navel), per case	17s. to 20s.
Oranges (other), per case	7s. to 12s.
Passion Fruit, per half-bushel case	3s. to 12s.
Lemons, per bushel case	9s. to 12s.
Papaw Apples, per double-case	6s. to 7s.
Pineapples (Queens), per case	12s. to 15s.
Pineapples (Ripleys), per double-case	9s. to 11s.
Pineapples (Common), per case	7s. to 8s.
Strawberries (Queensland) per tray	4s. 6d. to 10s.
Tomatoes, per quarter-case	7s. to 10s.
Cucumbers, per case	20s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Article.	OCTOBER. Prices.
Apples (Tasmanian), per case	14s. to 22s.
Apples, Cooking, per case	12s. to 15s.
Apricots, per case	5s. 6d. to 10s. 4d.
Bananas (Cavendish), per dozen	2d. to 4½d.
Bananas (Sugar), per dozen	2d. to 4d.
Cape Gooseberries, per quarter-case	7s. to 10s.
Cherries, per case	5s. to 10s.
Cocoanuts, per sack	12s. to 15s.
Custard Apples, per quarter-case	5s. to 8s.
Granadillas, per quarter-case	...
Lemons (Lisbon), per case	5s. to 8s.
Loquats (Mammoth), half-bushel case	5s. to 11s.
Limes (Choice), per case	7s. to 8s.
Mandarins, per half-case	3s. 6d. to 5s. 6d.
Mangoes, per case	5s. to 7s.
Oranges (Navel), per case	8s. to 12s.
Oranges (other), per case	8s. to 12s.
Papaw Apples per quarter-case	2s. to 4s. 8d.
Passion Fruit, per quarter-case	5s. to 8s.
Peaches, per case	1s. 6d. to 3s. 6d.
Peanuts, per pound	3d. to 4d.
Rosellas, per sugar bag	...
Pineapples (Ripley), per dozen	5s. to 9s.
Pineapples (Rough), per dozen	5s. to 6s.
Pineapples (Smooth), per dozen	8s. to 16s.
Rockmelons, per case	3s. to 12s.
Strawberries, per dozen pint boxes	5s. to 12s.
Strawberries, per tray	4s. 6d. to 10s. 6d.
Tomatoes, per quarter-case	2s. 6d. to 8s. 6d.
Watermelons, per dozen	7s. to 12s.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1915.

Animal.	OCTOBER. Prices.
Bullocks	£20 5s. to £28 2s. 6d.
Cows	£15 5s. to £17 7s. 6d.
Merino Wethers	32s. 6d.
Crossbred Wethers	32s.
Merino Ewes	28s.
Crossbred Ewes	35s. 6d.
Lambs	36s.
Pigs (Porkers)	45s.

Messrs. Clark Bros., stock and station agents, Bundaberg, inform us that early in November prices ruled high for pigs. One barrow pig, bred and fattened on Tantitha Station, was sold for £8 7s. 8d., and two barrows, fattened on Wombah Station, fetched £7 11s. and £7 1s., respectively. These were record prices for the district.

LONDON QUOTATIONS.

Cotton (Uplands), 6·89d.; S.I. cotton, 18d. to 30d. per lb.

Jute, £25 10s. per ton.

Sisal hemp, £35 10s. per ton.

Rubber: Fine hard Pará, 3s. per lb.; plantation, first latex crêpe, 3s. 1½d.; smoked sheet, 3s. 0¼d.

Copra (S.S.), £28 2s. 6d. per ton.

TIMES OF SUNRISE AND SUNSET AT BRISBANE—1915.

(From which those at places west of Brisbane can be reckoned.)

COMPUTED BY D. EGLINTON, F.R.A.S.

Date.	September.		October.		November.		December.	
	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·4	5·33	5·30	5·47	4·59	6·4	4·46	6·27
2	6·3	5·33	5·29	5·48	4·58	6·4	4·46	6·28
3	6·2	5·34	5·28	5·48	4·58	6·5	4·46	6·28
4	6·1	5·34	5·27	5·49	4·57	6·6	4·46	6·29
5	6·0	5·35	5·26	5·49	4·57	6·6	4·46	6·29
6	5·59	5·35	5·25	5·50	4·56	6·7	4·46	6·30
7	5·58	5·36	5·24	5·50	4·55	6·8	4·46	6·30
8	5·57	5·36	5·23	5·51	4·54	6·9	4·47	6·31
9	5·56	5·37	5·22	5·51	4·53	6·10	4·47	6·32
10	5·55	5·37	5·21	5·52	4·53	6·11	4·47	6·33
11	5·53	5·38	5·20	5·52	4·52	6·11	4·47	6·34
12	5·52	5·38	5·19	5·53	4·51	6·12	4·47	6·35
13	5·50	5·38	5·18	5·53	4·51	6·12	4·48	6·36
14	5·49	5·39	5·17	5·54	4·50	6·13	4·48	6·36
15	5·48	5·39	5·16	5·54	4·50	6·14	4·48	6·37
16	5·46	5·40	5·15	5·55	4·49	6·15	4·49	6·38
17	5·45	5·40	5·14	5·55	4·49	6·16	4·49	6·38
18	5·44	5·41	5·13	5·56	4·48	6·16	4·50	6·39
19	5·43	5·41	5·12	5·56	4·48	6·17	4·50	6·39
20	5·42	5·42	5·11	5·57	4·48	6·18	4·51	6·40
21	5·41	5·42	5·10	5·57	4·48	6·19	4·51	6·40
22	5·40	5·43	5·9	5·58	4·47	6·20	4·52	6·41
23	5·39	5·43	5·8	5·58	4·47	6·21	4·52	6·41
24	5·37	5·44	5·7	5·59	4·47	6·21	4·53	6·41
25	5·36	5·44	5·6	5·59	4·47	6·22	4·53	6·42
26	5·35	5·45	5·5	6·0	4·47	6·23	4·54	6·42
27	5·33	5·45	5·4	6·0	4·47	6·24	4·54	6·42
28	5·32	5·46	5·3	6·1	4·47	6·25	4·55	6·43
29	5·31	5·46	5·2	6·1	4·47	6·26	4·55	6·43
30	5·30	5·47	5·1	6·2	4·47	6·27	4·56	6·44
31	...	...	5·0	6·3	...	...	4·56	6·44

PHASES OF THE MOON, 1915.

On or about the 150th Meridian, East Long.

			H.	M.	
2 Sept.	☽	Last Quarter	12	56	a.m.
9 „	●	New Moon	8	52	p.m.
16 „	☾	First Quarter	5	21	„
23 „	○	Full Moon	7	35	„

The moon will be at its least distance from the earth, roughly about 226,000 miles, on 14th September; and at its greatest distance, about 252,000 miles, on 2nd and 30th September.

1 Oct.	☽	Last Quarter	7	44	p.m.
9 „	●	New Moon	7	42	a.m.
15 „	☾	First Quarter	11	51	p.m.
23 „	○	Full Moon	10	15	a.m.
31 „	☽	Last Quarter	2	39	p.m.

The moon will be at its least distance from the earth on 11th October, and at its greatest distance on the 27th.

7 Nov.	●	New Moon	5	52	p.m.
14 „	☾	First Quarter	9	3	a.m.
22 „	○	Full Moon	3	36	„
30 „	☽	Last Quarter	8	10	„

The moon will be at its least distance from the earth at midnight on 8th November, and at its greatest distance on the morning of the 24th.

7 Dec.	●	New Moon	4	3	a.m.
13 „	☾	First Quarter	9	38	p.m.
25 „	○	Full Moon	10	52	„
29 „	☽	Last Quarter	10	59	„

The moon will be at its least distance from the earth on the morning of 7th December, and at its greatest distance on the morning of the 21st.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 17 m., 28 m., 36 m., and 47 minutes, respectively, later than at Brisbane at this time of the year.

At Roma, on 1st September, the sun will rise about 6·19 and set about 5·51; on 1st October t will rise about 5·46 and set at about 6·4; on 1st November it will rise about 5·18 and set at about 6·20; on 1stDecember it will rise about 5·7 and set at about 6·41.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed by D. Eglinton, F.R.A.S., and should not be reproduced without acknowledgment.]

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put out a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so, they are apt to become fly-infested.

Watermelons and rockmelons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them, as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the Autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a

very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district; apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, and grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth, examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market—not before. If sent down green, they will sell for cooking and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish Blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw, grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflowers, mustard, cabbage, celery, radish, for Autumn and Winter use. Sow celery in shallow, well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed, except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the early worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower beds gay and attractive during the Autumn and Winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost, then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle life them gentle one by one with a knife or a zinc label—*never pull them up by hand,* as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to overwater at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather proves dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work; the flower garden in Autumn and Winter will present a charming sight and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.